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A

TREATISE ON HERNIA,

EXPLAINING

ITS VARIETIES, SITUATION, SYMPTOMS, AND CAUSES;

TO WHICH IS ADDED

A FULL DESCRIPTION OF THE

CONSTRUCTION AND APPLICATION

OF THE

MOST APPROVED MECHANICAL REMEDIES.

BY G. S. ACRET,

TRUSS MAKER, 39, HOUNDSDITCH.

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PREFACE.

It is now sixteen years since I left the profession, and directed my attention solely to the management of Hernia, during which period I have had too many opportunities of witnessing very distressing and unmanageable cases, cases that would never have been allowed to progress had the sufferers been better acquainted with the nature of the complaint, or had they been warned of the consequences of neglect. A strong desire to be useful to my fellow man, and, I will not deny it, a wish to make myself more known, first induced me to deliver Lectures on Herniæ at the various Mechanics' Institutions in both town and country. The great success attending those Lectures is the cause of the publication of these few sheets. Whether they will prove equally useful it is impossible to foretel. A great

portion of the anatomical description is from memory, refreshed by reading and reference to notes made when I was a pupil of the late Mr. Brooks ; it is therefore probable that there may be a few errors, yet I think it will be found sufficiently accurate to convey to the reader correct notions of the situation of the various herniæ. Some of my readers may perhaps object to the nudity of the plates. I confess that a work addressed to the public ought to be accompanied with plates as little offensive to modesty as possible. The difficulty of concealing some parts, while explaining their relation to other parts, will, I hope, be accepted as a sufficient apology for sending them forth in their present state.

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TREATISE ON RUPTURE.

Rupture, or Hernia, is a displacement of some of the contents of one or other of the three cavities of the body, viz. head, chest, and abdomen; but in this work those only which take place at the natural openings of the last-mentioned cavity will be noticed.

The term *cavity*, when used by Anatomists, does not, as in common language, denote a void or empty space, but a space containing the viscera: for it is in every instance completely and accurately filled; when, therefore, any part or parts, naturally contained in the cavity of the abdomen, pass out of that cavity, it constitutes a rupture.

The abdomen contains many of the important parts of the human body, as the stomach, intes-

tines, omentum, liver, spleen, pancreas, and mesentery; to which may be added the kidneys, the bladder, and the internal parts of generation. These are all contained betwixt the circumference of the false ribs and the bottom of the pelvis; that is, the space between a line of circumference at the pit of the stomach and another at the pubis, is usually denominated the abdomen. Its boundaries, therefore, are—above, the cartilages of the ribs and the diaphragm, which separates it from the chest; at the back, the lumbar vertebræ; in front and at the sides, the abdominal muscles; and below, the bones of the pelvis. The abdomen is also divided into regions—the epigastric or upper region includes the part covered at the sides by the ribs: the lateral portions are named the right and left hypochondria; and the depression in the middle, the scrobiculus cordis. The umbilical, or middle region, is the space immediately under the former, and extends to the hips; its sides are called the lumbar regions. The hypogastric, or lower region, is subdivided into three parts; one middle, termed public region; and two lateral, named inguinal regions, or groins; these latter are the seat of inguinal her-

nia. The abdomen may be also divided into parts *containing* and *contained:* those *contained* are the parts already enumerated—the parts *containing* are the skin, the fat, the muscles, and the peritoneum. The muscles of the abdomen are ten in number, five on each side, and lie one on the other ; their names are the external oblique, the internal oblique, the transversalis abdominis, the rectus abdominis, and the pyramidalis. On removing the integuments (skin and fat), the first muscle seen is the external oblique, immediately under which lies the internal oblique, and under that the transversalis abdominis ; the rectus abdominis is in front of the abdomen, and lies under the tendons of the oblique muscles. The pyramidalis is a small muscle arising from the os pubis, and terminates in a point at about an equal distance between the navel and the pubis, and lies anterior to the rectus muscle. Immediately in front of the belly a depressed line is seen, running from the breast bone to the pubis ; this line is called the linea alba, and is formed by the muscles of one side meeting and interlacing with those of the opposite side. About four inches from the linea alba, laterally, a similar line is seen, called the linea

semilunaris, formed by the tendons of the two oblique and transverse muscles uniting at the edge of the rectus before they separate to form the sheath for that muscle. The rectus, therefore, lies between the linea alba and the linea semilunaris. The general form of the two recti and the external oblique muscles, as also the linea alba and the linea semilunaris, may be seen by referring to any muscular figure. The attachments, technically called the origin and insertion of the muscles of the abdomen, are as follows: *External Oblique*—this muscle is attached to the eight lower ribs, to the breast bone, to the hip, and to the pubis; from the ribs to the hip, and partly over the belly, it is fleshy, the fibres running obliquely downwards and forwards about the middle of the side of the belly it terminates in a thin broad tendon, which passes over the whole front of the belly to be united to its fellow muscle at the linea alba; this tendinous expansion is called the tendon of the external oblique muscle; the lower part of the tendon, where it is stretched from the hip to the pubis, is somewhat thickened, and is often described as a separate ligament, by the name of pouparts ligament.

Internal Oblique. This muscle arises by short

tendinous fibres, which soon become fleshy from the whole length of the spine of the ilium, from the three inferior vertebræ of the loins, and from the upper parts of pouparts ligament, at the part nearest the ilium (hip). It is inserted into the six or seven lower ribs, into the ensiform cartilage, and the linea alba. The inferior edge of this muscle extends in a nearly straight direction over the spermatic cord, and gives off a tendon which runs behind the upper part of the abdominal ring, and is inserted into the lower part of the linea alba and into the symphysis pubis.

The *Transversalis Abdominis* arises from the fascia lumborum, from the spine of the os ilium, from the inner surface of pomperts ligament, and from the back part of the cartilages of the seven lower ribs ; it is inserted into the ensiform cartilage and into the whole length of the linea alba, excepting its lowermost part, for at about an equal distance between the navel and the pubis a slit is formed in the tendon, through which the rectus abdominis passes, and the remainder of the tendon passes before the rectus to be inserted into the lower part of the linea alba ; its inferior edge is connected with that of the preceding muscle in its insertion into the pubis.

The *Rectus Abdominis* arises by a flat tendon from the fore part of the pubis ; as it ascends its fleshy belly becomes broader and thinner : it is inserted into the ensiform cartilage and into the three inferior true ribs.

The *Pyramidalis.* As this muscle is not at all important, as far as regards any connection with the parts concerned in the formation of Rupture, it is useless to enter into a more particular description of it than has already been given. The principal use of the muscles of the abdomen is to bend the body ; to act, by their contraction, upon the parts contained in the abdomen, as the intestines, the bladder, and the uterus ; to cause the discharge of fæces and urine, to assist in the expulsion of the fœtus, and also to assist in respiration.

Abdominal Ring. This is merely an oblique slit or opening just above the angle of the pubis, formed by the tendon of the external oblique muscle, divided into two portions, for the passage of the spermatic cord in men, and the round ligament of the womb in females : the two portions forming this slit are called the columns of the ring—the inferior or external column (pouparts ligament) is attached to the

spine and crest of the pubis, the superior or internal column is attached to the symphysis pubis.* This slit, although named a ring, is triangular, the os pubis being the base and the two columns the sides of the triangle. Judging from the mode of treatment employed by Surgeons formerly, they must have supposed that this aperture was continued direct into the abdomen; but such is not the case, as all direct passage is closed by tendons and fascia; for the tendons of the internal oblique and transversalis muscles are behind this slit; it is also closed by a fascia, called the fascia transversalis.

The aperture through which the spermatic cord first emerges from the cavity of the abdomen is situated an inch and a half distant from the abdominal ring, in a direction towards the hip bone, but this part will be more accurately described when I come to explain the anatomy of inguinal hernia.

Immediately under the transversalis, which is the innermost muscle of the abdomen, and between it and the viscera, lies the peritoneum. This is a thin but strong membrane, lining the

* The crest of the pubis, and the anterior superior spinous process of the ilium are shewn in Plate 1.

whole cavity of the abdomen, and not only includes all the parts contained in that cavity, but also each part in particular. This membrane has great spring or elacticity, and though thin admits of considerable extension without being torn, as in dropsy and pregnancy. Its internal surface is smooth and polished and is constantly moistened by a fluid exhaled by the minute arteries of the part which renders it smooth and soft, by which the motions of the viscera are performed with perfect facility, and prevented from adhering to each other or to the sides of the containing cavity. The external surface is rough and cellular, and adheres to various parts of the parieties, but to some more firmly than to others, its connection, at the lower part of the belly, is by a soft elastic cellular substance, which yields when this membrane is long subjected to any distending force ; as in the inside of the belly, the peritoneum incloses the bowels, so does it continue the same office in hernia, for every case of hernia (with one or two exceptions), however large, has a continuation or elongation of this membrane surrounding and enveloping them, and is then called the hernial sac.

On removing the parieties of the abdomen

and the peritoneum, the omentum presents itself to view, proceeding from the great curvature of the stomach, and hanging down like a flap over the intestines, The stomach will be found lying in the left hypochondriac and upper part of the epigastric regions, but when distended it protrudes into the umbilical region. The alimentary tube is a continuous canal from the stomach to the fundament. In men it is six or seven times the length of the subject. This canal is divided into small and large bowels, and these are sub-divided : the small bowels are called the duodenum, the jejunam, and the ilium ; the large bowels are the cœcum, the colon, and the rectum. The great transverse arch of the colon will be seen projecting through the omentum ; it mounts up from the right side, crosses the belly under the edge of the liver and under the great curvature of the stomach, and descending again upon the left side to the left groin, where it makes a turn over the brim of the pelvis and enters that cavity, when it takes the name of rectum. The colon is the largest of all the intestines ; at the beginning of this gut there is a valve which prevents the excrement which has once fallen into it from return-

ing to the ilium. The arched form of the colon is of great service in many complaints of the bowels, as when warm injections are thrown into it, it foments the rest of the bowels. The rectum begins where the colon terminates, and ends at the anus. The residue of the alimentary matter, when received into the large intestines, becomes fœculent, in which form it is expelled from the body.

The small intestines will be seen lying convoluted in the lower part of the belly; they are retained in their proper situation by a membrane, called the mesentery. This membrane is strongly tied to the three first vertebræ of the loins—its greatest length being attached to the bowels, which are fastened to it somewhat similar to the border of a cap, and to every inch of mesentery there is about three of intestine; by this arrangement the bowels enjoy a gentle motion, floating as it were on each other without being entangled.

RESPIRATION.

The cavity of the chest which contains the heart and lungs and the cavity of the abdomen are divided by a broad thin muscular septum,

called the diaphragm. In its natural state, the diaphragm is convex on the upper side towards the breast, and concave on the lower side towards the belly; but in inspiration its fibres swell and contract, and it then becomes plane on each side, elongating the cavity of the chest to give liberty to the lungs in their then inflated state, and pressing the abdominal contents downwards and forwards, the abdominal muscles at the same time relaxing and expanding. In expiration the muscles of the abdomen contract, pushing back the viscera and diminishing the capacity of the thorax. A regular succession of these alternate contractions of the diaphragm and abdominal muscles constitute ordinary respiration.

ANATOMY OF EXTERNAL INGUINAL HERNIA.

The preceding pages have explained that the triangular aperture, commonly called the abdominal ring, is formed by the tendon of the external oblique muscle, divided into two portions and called the columns of the ring; the thickened portion, called pouparts ligament, is inserted into a small process of the pubis, named the spi-

nous process, and thence continued to the crest of the pubis, being about an inch; the other separated portion of the tendon of the oblique muscle is inserted into the symphysis pubis, and extends across the cartilage of the bone of the pubis on the opposite side, so that the right and left internal columns of the rings cross each other at the symphysis pubis, therefore the triangular slit is formed thus: pouparts ligament, where it is attached to the os pubis, forms the inferior or external column; the portion of tendon attached to the symphysis the superior or internal column, and the pubis the basis of the slit or ring. The upper part of the ring is strengthened by some tendinous fibres,* which cross it, and which also give its apex a rounded form. This aperture or ring is closed towards the abdomen, partly by the tendons of the internal oblique and transversalis muscles, but more so by a fascia, called the fascia transversalis, which fascia is extended from the posterior edge

* Scarpa, in speaking of the use of these fibres, says, "one would be led to say, that by means of them, nature had intended to fix the limits of the inguinal ring, and to oppose the divergence of the tendinous pillars towards the side."

of pouparts ligament, and continues upwards between the periotenum and transversalis muscles, on the surface of which it is lost. About an inch and a half from the abdominal ring, obliquely upwards and outwards (viz. towards the hips), the fibres of the fascia transversalis separate and form another opening, called the upper ring, through which the spermatic cord first emerges from the abdomen. The upper ring is formed thus : the two sides by the separated portions of the fascia transversalis and the upper part by the lower edges of the internal oblique and transverse muscles. The apex of the upper ring points towards the pubis, the apex of the lower ring towards the hip. By this description it will be understood that the spermatic vessels, after passing through the upper opening, traverse a canal about an inch and a half in length, then pass through the lower opening into the scrotum (see Plate II). This canal is called the inguinal canal, and is formed, in front, by the tendon of the external oblique muscle ; and behind, by the fascia transversalis. The reader will recollect that the peritoneum lines the whole cavity of the abdomen and envelops its contents ; that it is situated between the bowels and the

fascia forming the upper ring, consequently, when rupture occurs, the membrane is forced through the opening and forms the hernial sac or bag. When the parts are in a natural and healthy state, it is probable that the upper ring through which the cord passes is only sufficiently large for that purpose, but when preternaturally enlarged, by relaxation or otherwise, rupture is very likely to occur, as then the frequent repetition of downward pressure will in time force some of the contents of the abdomen through the enlarged ring into the canal, thus forming a tumour, which will encrease in size slowly or rapidly, according as the resistance of the parieties is greater or less. It has been stated that the external surface of the peritoneum is rough and attached to the parieties by a cellular substance, in some parts more firmly than in others. In the neighbourhood of the groin its attachment is rather slight; therefore, when the aperture is large and the peritoneum relaxed, it is easily forced through the ring, and soon adheres, in its new situation, to the surrounding parts, forming a cavity continuous with that of the abdomen, and when the contents of the rupture are returned the sac remains behind. While the rupture

is confined in the canal, that is, has not passed through the lower opening, it is called Bubonocele, External Inguinal Hernia, Oblique Inguinal Hernia.

INTERNAL INGUINAL HERNIA.

In the description of External Inguinal Hernia, it was stated that the lower ring was closed towards the abdomen by the tendons of the internal oblique and transversalis muscles, and by the fascia transversalis, and that the viscera first passed through the upper ring and traversed the inguinal canal; but in this species of rupture the viscera are protruded direct through the lower opening without passing through the canal. From the opinion of various authors it appears that before this rupture can take place, some of the following circumstances must exist. Either the abdominial ring is preternaturally enlarged, or the fascia transversalis unnaturally thin, or the fascia either torn by violence, or from malformation not existing, or the parts generally much relaxed. Other authors doubt the necessity of the fascia being thinner than usual or torn by violence, and, in confirmation

of such doubt, mention having dissected these herniæ where the fascia was neither thinner than usual nor separated by violence, but had been protruded before the peritoneum, and formed a thick aponeurotic covering to the hernial sac. Whether such appearances on dissection invalidate the opinion of the necessity that the fascia should be thinner than usual, I must leave the profession to decide; yet I would suggest the probability of the fascia having been, before rupture occurred, thinner than usual; but having become thickened after its protrusion, in the same manner as the peritoneum does in most ruptures. That gradual and moderate distension tends to the thickening of fibre is, I believe, an acknowledged fact; indeed it is constantly seen in the encreased size and thickness of the cremaster muscle in large scrotal ruptures. Internal Inguinal Hernia rarely attains a large size, but from the circumstance of its direct passage from the abdomen through an opening close to the bone, it is very difficult to be secured, as will be explained when speaking of trusses. This hernia is also called Ventro Inguinal and Direct Inguinal.

OSCHEOCELE, OR SCROTAL RUPTURE.

Some writers have not considered Inguinal Hernia complete until it has descended into the scrotum; but as far as the signification of the word hernia applies, the complaint is as complete when the tumour is confined to the groin, as when it has passed into the scrotum. If the opposition of the lower opening to the further descent of the tumour is great, the swelling will expand in the groin, and sometimes attain a very large size; but when the resistance of the lower opening has given way, the bulk in the groin subsides, and very little swelling is seen there, it having descended into the scrotum, when it takes the name of Oscheocele or Scrotal Rupture. This process materially alters the character of the rupture, particularly as it affects the sac, and when of long standing and has been neglected, alters the relation of the apertures. The sac has its relative parts, viz. mouth, neck, body, and fundus; these parts alter according to the nature and extent of the swelling. The mouth of the sac is that part in contact with the ring. The neck is the contracted part between the mouth and the expanded portion, the fundus is the most distant part or bottom of

the sac, the body is the part between the neck and the fundus; the whole is in shape similar to an India rubber bottle. In ruptures confined to the groin there is little or no neck, because the tumour expands as soon as it has left the abdomen; but when it has passed into the scrotum, the neck becomes longer, being, after a short time, the length of the inguinal canal. It is again shortened when the canal is partially or wholly destroyed by the approximation of the rings, or by their becoming one aperture, and it is the circumstance of the two rings being enlarged into one that accounts for the large size of the opening in old and large scrotal ruptures. It has been observed that within a short time (a few days) after rupture has occurred, the sac adheres to the surrounding parts; this adherence is by cellular texture, of which the fibres are soft and pliant, so that as the rupture encreases the peritoneum descends with it, without destroying these connections. It has also been observed that the natural distance of the rings from each other is, in the adult, about an inch and a half, and that the space between these openings determines the length of the canal; but after rupture has occurred, especially after it has

passed the lower opening, the weight and size of the tumour enlarges the upper ring downwards, and the size of the tumour by distention enlarges the lower ring upwards, by which process of approximation they ultimately become one, in which case the canal will be destroyed, and the viscera will then pass direct from the abdomen, as in Direct Inguinal Hernia, but with this difference, that in the former case the separated fibres of the fascia transversalis forming the upper ring give way until the openings become one; whereas in the latter the canal is not destroyed, but the fascia and peritoneum are thrust direct through the lower opening. When Scrotal Herniæ increase to a large size, considerable inconveniences are frequently experienced, such as constipation, flatulence, indigestion, colic, and a numerous train of other unpleasant symptoms; but in some few instances, no other uneasiness than that arising from the situation and weight of the tumour is felt. If we consider that all that portion of the bowels which is in the scrotum is deprived of the pressure of the abdominal muscles, so necessary to the due performance of its functions, the extent to which nature accommodates herself is really surprising.

Considerable discrepancy of opinion prevails as to the proper management of old, large, and neglected Scrotal Reducible Ruptures. If the whole of the hernia be reducible, it becomes an important consideration to confine it within the abdomen, unless some particular condition of the parts prohibit the attempt. The question to be decided is, under what circumstances such prohibition is proper. I have seen many ruptures which might have been supported, but a truss was not allowed to be worn, because the Surgeon prognosticated fearful consequences. The objections advanced against their being returned and secured are, that these ruptures having resided long in the scrotum, the abdominal muscles and the peritoneum have contracted to the diminished cavity of the abdomen, that the remaining viscera are in all probability displaced from their proper situation, and that the replacing so large a rupture in the diminished cavity is likely to produce symptoms out of the power of surgery to control. A middle course has therefore been recommended, namely, gradually to accustom the parts to accommodate each other, by returning a portion only of the rupture at a time, and retaining the same by

means of a laced suspender; lessening from time to time the size of the bag enveloping the tumour until the remainder may be safely returned and secured by a proper truss, without fear of unpleasant consequences. That serious symptoms may and have arisen from large ruptures being returned and secured I can readily conceive, and I confess the reasons adduced to discourage such practice appear just and reasonable, nevertheless truth compels me to acknowledge that the same does not accord with my own experience, inasmuch as I have, under the superintendance of professional gentlemen, returned and secured several hundred very large and neglected or old herniæ, where no unfavorable symptoms occured. I remember the two following cases only being attended by any symptoms causing the least alarm.

CASE I.

R. D. aged between 50 and 60, a patient of Mr. Robarts, Surgeon, Sun-street, was sent to me by that gentleman on the 23rd April, 1829, with a very large double scrotal rupture, hanging down nearly to his knees and measuring 26 inches in circumference at the largest part (vide

Plate III.) On first seeing this rupture I had no other idea than that of supporting the weight by a suspender, but on placing the patient in the recumbent position and using the taxis for the purpose of ascertaining how much could be returned, to guide me in fitting the suspender. I was much surprised to find the whole returnable. On enquiring into the history of the case up to that time, I found that for fifteen years it had been very large, but had latterly increased considerably in size; that it did not occasion any very great uneasiness, further than what was produced by the great weight and size, which prevented the enjoyment of much locomotion, and that it had sometimes returned spontaneously while in bed. I proposed to the patient to make a trial of supporting it with a truss to which proposal he readily consented; but as I had no instrument by me exactly proper for his case, I desired him to go home and keep himself quiet, promising to see him the following day. In the interim I consulted Mr. Robarts as to the propriety of returning the rupture and supporting it with a truss, when that gentleman decided that an attempt should be made. About six o'clock the following evening I went to the

patient's house prepared with a suitable truss. After he had emptied the bladder I gradually returned the whole of the rupture and kept it supported for some time with my hands, the patient not experiencing any inconvenience nor the abdomen being very tense; I then applied the truss, and after remaining with him for an hour left him perfectly easy. At ten o'clock I again saw him, and found him suffering from nausea, violent head-ache, and pain in the side, the abdomen very tense, and the pulse very much accelerated. Mr. Robarts, who was present, immediately bled him and prescribed such other remedies as he considered most proper, which considerably abated those unfavorable symptoms, and they daily subsided. The patient was confined to the recumbent position about three weeks, and within six weeks after the first application of the truss he took a journey to Portsmouth, and has had his rupture controlled ever since.

The most surprising part of the case, is, that so large and old a rupture had not contracted adhesions.

CASE II.

On the 20th of June, 1831, John King, aged

44, was sent to me by Mr. Delph, Surgeon, at Edmonton.* On examining this patient, I found he had a very large single scrotal hernia, about the size of the head of a child five years old; he told me that he had had scrotal rupture for several years, and that it had never been properly confined; that while suffering from great weekness, produced by severe illness (I believe brain fever,) from which he was only then convalescent, his rupture had attained the size above stated. A truss was made and forwarded to Mr. Delph, who returned the rupture and applied the instrument, soon after which some intestinal derangement took place, but which gave way to the remedies prescribed. From the size of the tumour, the integuments of the scrotum were of course much distended, but when the hernia was reduced they became extremely loose and flaccid, and by some position of the body got turned up and pressed between the thigh and the truss, the brass stud of which caused an abrasion of the skin, producing a small ulcer, which speedily became larger, and the parts, to about the size of a crown piece, sloughed, nevertheless in the early part of July he was enabled

* Mr. Delph now resides at Newington Causeway.

to follow his usual avocations with the hernia completely secured. Two months subsequent to this period, the scrotum became again enlarged by hæmatocele, and the tumour, by raising the pad, allowed a portion of the rupture to escape. A laced suspender was applied, and, as the general health of the patient was very indifferent, he again took to his bed. In a fortnight the tumour had subsided, when the truss was again applied, and he has been since doing very well.

Now if these ruptures are neglected and allowed to remain in the scrotum, the patient is subject to all the distressing symptoms incident to large irreducible hernia, neither is he free from the danger of strangulation. It is true that large ruptures are not so liable to strangulate as smaller ones, owing to the large size of the ring, yet when they do become strangulated they are more rapidly fatal. Although I have elsewhere observed that, in some instances, but little inconvenience is felt, yet in the majority of such herniæ the reverse is the case. I have at this moment before my mind's eye several persons whose sufferings are extreme, one in particular who lives in my neighbourhood. This man's

hernia is a constant annoyance to him ; he declares that he has no comfort either asleep or awake, his time is principally occupied in talking of his sufferings or in seeking relief, but the only effectual relief, that of supporting his rupture by a truss, he, in common with many others, has been effectually prejudiced against by an exaggerated statement of the probable consequences. Many persons neglect rupture until it becomes distressing to themselves and difficult for others to manage, and they are often disappointed because the truss does not immediately secure it; till at length, after unsuccessfully trying every description of truss, they despair of ever succeeding in effectually supporting the hernia. This want of success does not always arise from the inefficiency of the instrument, but mostly from improper management. With some ruptures it is positively necessary to confine the patient for some time to the recumbent position before the hernia can be completely secured. If those who undertake the management of these complaints would bear in mind that the cavity of the abdomen is always accurately filled (for as the viscera descends into the scrotum the abdominal muscles and peritoneum contract and

adapt themselves to the remaining contents), they would see the necessity of availing themselves of position to enable the truss to perform its office. While in the recumbent position the rupture is more easily secured, and after it has been retained for some time, the parts become accustomed to remain within the abdomen. That part of the mesentery attached to the portion of gut forming the rupture was, while in the scrotum, elongated; but when returned and kept secured, contracts, perhaps sufficiently to draw the gut up and keep it suspended. Indeed by directing the patient to keep the horizontal position for some time incidental facilities will assist our efforts to an extent which we could not expect while the patient was erect.

CASE III.

A gentleman from Woolwich applied to me in the Autumn of 1833, to ascertain if it were possible to make a truss that would secure his rupture, it being at that time a large single scrotal rupture. He informed me that he had had rupture about ten years; that when he first discovered it, it was not larger than a small egg and confined to the inguinal canal; that as it

did not then annoy him, he paid no attention to it, and did not apply for advice until long after it had become scrotal rupture, when, on account of some alteration in its condition (probably a fresh protrusion), accompanied by difficulty in returning it, he became alarmed, and then, for the first time, applied a truss which was perfectly useless, as was every other which he had since tried. I easily prevailed upon him to try the recumbent position, I applied one of his old trusses, which, with ten days' confinement, answered every purpose, and this small sacrifice of time was amply repaid, as he has since experienced no further difficulty.

CASE IV.

A short time since I was sent for by a gentleman residing in Aldgate, and received instructions to make two suspenders according to a pattern in his possession. This gentleman's rupture was single, perfectly reducible, not larger than one's double fists, and principally composed of intestine. He stated that he believed he had tried every description of truss in use, but had never succeeded in securing his rupture above an hour or two at a time, he had therefore been

advised to content himself with wearing a suspender, made to fit accurately, hoping by that means to prevent the increase of the tumour. I offered to secure his rupture with a truss if he would submit to a few days' confinement, but whether he discredited my ability to do so, or was discouraged by the repeated trials he had already made, I cannot say: he refused to make any further attempt, and is now wearing a suspender only, and liable to all the inconveniences and accidents appertaining to an irreducible rupture.

It is probable that many of the instruments procured for this gentleman would have had the desired effect if they had been assisted by position.

CONGENITAL HERNIA.

Congenital Hernia is described by some authors as being cœval with birth; but it is more properly described by others as a disposition of certain parts to admit of rupture at the time of birth; for the protrusion very frequently does not take place until long after. The testicles, before birth, are in the abdomen, in the neighbourhood of the kidneys, but about the eighth

month they have passed through the upper ring and gradually descend through the inguinal canal into the scrotum, carrying before them a portion of peritoneum (which, in its new situation, is called the tunica vaginalis testis), precisely in the same manner as a rupture carries with it its sac. The aperture of the tunica vaginalis, that is, the part nearest the cavity of the abdomen, is commonly obliterated before birth, but if not, then the parts are in a predisposed state for congenital hernia; for when rupture occurs in this case, it passes through the opening of the tunica vaginalis and lies in contact with the testicle; whereas had that opening been obliterated, rupture could only have been formed by a fresh protrusion of the peritoneum. This variety of rupture, although most common with infants, is sometimes met with in adults, where the testicles has not descended so early as usual. I have myself seen several cases of congenital hernia in adults, one was that of a gentleman 30 years of age. The treatment, as far as trusses are concerned, is the same as in ordinary rupture, except where the testicle has not descended into the scrotum but lies in the groin, or in any way interferes with the application of the truss;

in such cases the instrument must be constructed to suit individual peculiarity.

FEMORAL HERNIA.

This hernia passes out of the abdomen through a small opening, called the femoral ring, situated close to the femoral artery and vein. In the description of *External Inguinal Hernia*, the aperture through which the spermatic cord emerges from the abdomen, consequently, where the rupture first escapes is mentioned as being above pouparts ligament, and at equal distances between the symphysis pubis and the anterior superior spinous process of the ilium. In *Direct Inguinal* Hernia the protusion escapes through the abdominal ring, close to the symphysis pubis; and although pouparts ligament forms one of the columns of the ring, yet, from its oblique direction, the rupture passes over it; but the femoral hernia escapes under pouparts ligament, nearer the symphysis pubis than External Inguinal Hernia, but more distant from it than Direct Inguinal Hernia. (Vide Plate IV.) In External Inguinal Hernia, the tumour discovers itself in the groin; in Direct Inguinal in the scrotum; and in Femoral in the bend of the thigh. Fe-

moral Hernia is more common to females, indeed it is peculiar to them, as we rarely find them afflicted with Inguinal. It is frequently more difficult to manage and more likely to strangulate than any other variety, arising from its situation, but oftener from neglect, as from motives of delicacy its progress is suffered in silence till life is at stake, when probably no resource is left but the operation.

UMBILICAL HERNIA, OR NAVEL HERNIA.

Those who neglect this rupture have not the same excuse as may be claimed for the neglect of any of the others. It may be, if necessary, exposed to view without the least violation of delicacy: it is not like the others, in the immediate neighbourhood of parts sacred to modesty; and yet how often do we see every expedient had recourse to rather than apply for the necessary relief. How much suffering might often be prevented by the timely application of the remedy. The pain and inconvenience often experienced by persons afflicted with Navel Rupture, when neglected and become irreducible, renders the remainder of life truly miserable. These herniæ are principally composed of omentum, the con-

nection of which to the stomach causes that organ to be particularly liable to irritation, and sufficiently accounts for the distressing symptoms often experienced. Umbilical Rupture is not so frequent as any of the others. Those most liable to it are children, women who have borne children, and lusty persons of both sexes. After the separation of the naval string in infancy, some time is required for contracting the ring and consolidating the parts; but with children who cry much this contraction and consolidation are prevented, and the parts disposed to rupture; and after the parts have contracted and become firm, as is the case with adults, they may be again weakened by distension, as in pregnancy and corpulency.

VENTRAL HERNIA.

Those protusions which take place in any part of the abdomen, except through the natural openings already noticed are called Ventral Herniæ; they mostly occur in the linea alba, between the navel and the breast bone, and sometimes in the linea semilunaris. Sir Astley Cooper assigns four causes for these herniæ; "the first and most common is, that apertures

are left in the linea alba and linea semilunaris, and between the fibres of the muscles for the passage of small blood vessels, and these holes are sometimes larger than is sufficient to allow the vessels to pass, and protrusions of the viscera readily occur through them. Another cause is that the formation of the linea alba is sometimes defective in children. A third cause is the laceration of some of the fibres of the abdominal muscles under violent exertions, which allow the peritoneum to pass between them. The fourth cause is a wound through the parieties of the abdomen, in which the skin afterwards heals but the muscles never unite." Ventral Hernia, situated above the navel, frequently contains a portion of the stomach: it is then often called rupture of the stomach, and is mostly attended with considerable disturbance of the functions of that organ. I have seen several herniæ of the latter description in slaughter-men, occasioned by blowing lambs: I was informed by one man afflicted with this species of hernia, that he had frequently blown five hundred lambs in a week.

IRREDUCIBLE HERNIA.

All herniæ which have resided long in parts

out of the abdomen are liable to form adhesions; this preternatural union arises from the occasional irritation or violence to which parts so situated are exposed, and is effected by an effusion of coagulable lymph, which glues as it were the parts together. The precise extent of this adhesion it is impossible on examination to decide, but that is a matter of no importance, as the treatment will be the same, except in cases where omentum only adheres. Herniæ may also become irreducible when no adhesion has taken place, but from the increased bulk of the protruded viscera, or both causes combined may operate to prevent the reduction. The treatment of them must depend solely on their peculiarities. Trusses are admissible in cases where the omentum only is irreducible. If in the groin, bend of the thigh, or at the navel, a truss with a cupped pad may be used. If scrotal rupture, and the omentum only remains in the scrotum, an ordinary truss may be applied; but in every case where the intestine is adherent, trusses would most certainly produce considerable irritation. In regard to the treatment of those herniæ which are irreducible from the increased bulk of the viscera, more is known from

reading than from experience. It has been previously explained that the intestines are tied to the spine by a membrane called the mesentery. In large scrotal ruptures, this membrane is dragged along with the intestines into the scrotum, and while there frequently increases in bulk sufficiently to prevent the return of the parts. The omentum, also, sometimes becomes considerably enlarged from fresh depositions of fat or from portions consolidating together, so as to form a lump or ball. Arnaud, in his *Dissertation on Ruptures*, mentions several cases of large herniæ of this description successfully treated by him, and the mode of treatment was, to confine the patient to his bed and prescribe a strict antiphlogistic regimen, by which the parts became so much reduced in size, as to allow of their being returned and supported by a truss. I have myself successfully treated smaller herniæ, become irreducible from the increased bulk of the omentum, by the agency of cold applications, such as ice, constantly applied to the part, and the recumbent position. When trusses were less perfect, cases of the above description were more frequent. In Arnaud's time the practice of attempting their reduction was common, but

in the present day has become almost obsolete, and such cases are now generally left to chance.

STRANGULATED HERNIA.

The difference between strangulated and irreducible rupture is that in the latter, although the parts may not be returnable and are constantly exposed to accident, yet the hernia is not in that condition by which we can infer immediate danger; but in strangulated hernia life depends upon the issue of a few hours. In irreducible hernia the parts are free at the ring and the functions of the alimentary canal, though somewhat interfered with, are not totally suspended. In strangulated rupture, the stricture on the intestine not only suspends its functions for the time being, but produces active inflammation; indeed the symptoms are usually so urgent that the most prompt measures become indispensably necessary. The strangulation may take place at the ring, or in the neck of the sac, or, as is sometimes the case, the old mouth of the sac may descend as the rupture increases, and form a second mouth similar to an hour glass, in which case it would be a likely seat for strangulation. The stricture is occasioned either by

the lessened dimensions of the ring or neck of the sac, or by the increased bulk of the parts from some fresh protrusion; the latter of which is by far the most probable; or it may be occasioned by an alteration in the parts already protruded.

I shall purposely abstain from describing the treatment for strangulated rupture for these reasons: first, because when persons themselves attempt the means of reduction much valuable time is lost; secondly, because their repeated attempts only increase the already irritable state of the parts, and render the case less manageable when the Surgeon arrives; and, thirdly, because the case is too important to be trifled with. I should therefore advise, that in every case where an alteration in the condition of the hernia for the worse has taken place, especially when accompanied by pain in the tumour and sickness, a Surgeon be immediately sent for. Nevertheless no objection can be made to the use of the warm bath, or cold applications to the tumour, in the interim.

THE TAXIS.

This is a technical term for the manual means used to replace the protruded viscera. Some

ruptures are so easily replaced, that they can be returned by pressure in any position of the body, or when lying down they will return of their own accord; others are less easily managed, requiring the assistance of position and some dexterity in handling them. It is always adviseable to use the recumbent position when endeavouring to reduce rupture; the patient should be placed on his back, with the shoulders and buttocks somewhat raised so as to curve the trunk, and relax the abdominal muscles; the leg on the ruptured side should be bent with the foot resting on the bed and the thigh rolled inwards.* If the hernia is composed of intestine, the circumference of the tumour should be grasped with the fingers and thumb pressing towards the centre to empty the gut of its contents; the tumour will then become flaccid and the reduction soon completed. If a large portion of gut has protruded, the same process of emptying it will be necessary, after which it may be returned piece by piece; this will be more readily effected by taking hold of the gut, and gently pulling it with one hand, so as to straighten the knuckle or fold, while it is gradually returned

* This applies to femoral and inguinal hernia.

and retained by the other. If the contents of the tumour is omentum, and but small, it will readily pass through upon pressure being applied; if large, the reduction will be facilitated by returning only small portions at a time; by pushing the whole bulk of the tumour towards the ring, we can never expect to succeed in the reduction, unless the ring be very large When the contents are both omentum and gut, the intestine is to be first emptied and returned as above described. In herniæ of considerable magnitude, the tumour must be compressed with both hands, with sufficient force to empty the intestines, when it may be pressed towards the opening, which in such cases is generally much enlarged, so as to admit a knuckle or fold of gut to pass through it. Should much difficulty arise in returning the rupture, it is better to wait a little and again repeat the taxis, than to irritate the parts by continuing one attempt too long. Before we proceed to the reduction of large herniæ, it is proper to empty the bladder, and in some cases the bowels also. The pressure, in reducing external inguinal hernia, should be directed upwards, outwards, and inwards; in direct inguinal hernia, upwards and inwards;

in femoral hernia, slightly downwards (to clear pouparts ligament), inwards, and upwards; in umbilical rupture, directly backwards.

CAUSES OF RUPTURE.

A variety of circumstances operate to produce hernia; but, for the sake of perspicuity, they may be classed under the terms, exciting and predisposing. The exciting causes are: 1. Muscular efforts, either in labour or sports; these may be termed voluntary. 2. Coughing, sneezing, straining at stool, or in difficulty of passing the urine from stricture; and with children crying and hooping cough; these may be turned involuntary. 3. Tightly laced stays, riding belts, and the navel bandage in children; or others constantly compressing the abdomen and preventing its due expansion in inspiration. The effect of all these is an increased pressure on the abdominal viscera. The predisposing causes are malformation and relaxation, producing a diminished resistance of the rings and parieties of the abdomen.

The prevalent opinion is, that the most common cause of hernia is exertion; and therefore that rupture is, comparatively speaking, con-

fined to the poor, because they are called upon to use that muscular exertion from which the rich are exempt.

In ordinary respiration, the pressure on the viscera in the descent of the diaphragm is accommodated by the expansion of the muscles of the abdomen, the belly rising and falling alternately with the ascent and descent of the diaphragm, but in extraordinary exertion the diaphragm and abdominal muscles contract at the same time, by which the cavity of the abdomen is much lessened and the viscera subjected to unusual pressure; the frequent repetition of this pressure, as in manual labour, is supposed gradually to weaken the parts connected with rupture, and ultimately to produce the complaint by thrusting the viscera from their proper situation through the opening formed for the passage of the spermatic cord, and carrying before them a portion of peritoneum which forms the hernial sac.

Consistently to support the opinion that exertion is the most frequent cause of rupture, it must be shown that exertion is the primary as well as the proximate cause. If a person, on using some extraordinary exertion, suddenly

experienced great pain in the groin, and was sensible that something unusual had occurred: if, on examining, a protrusion of the viscera was found, but the parieties in a firm state, and the ring constricting the protrusion, so as to experience some difficulty in replacing it, and when replaced that it did not again immediately protrude; the fair argument would be, that, up to the time of the accident occurring, there was no predisposition to rupture, but that exertion was the sole cause. On the contrary, suppose a persons ensible of the rupture occuring at the moment of using exertion, but that the parts were found to be in a relaxed state, the rupture not constricted by the ring, but readily reducible, and when reduced, disposed to reprotrude immediately; in fact, the resistance of the parieties diminished, how can it be ascertained in such a case whether exertion or predisposition were the remote cause?

That rupture is often produced by extraordinary exertion, no one who has had any experience in these complaints can doubt, and that it will facilitate the descent of the viscera when a predisposition exists is certain; but it is also certain that indolence or sedentary habits en-

courage a predisposition. I do firmly believe that if an impartial investigation were made, the complaint would be found quite as prevalent among those who lead sedentary lives as among those of more active habits. In upwards of twenty thousand cases of rupture which I have examined, by far the greater number have apparently proceeded from predisposition. It must be remembered, that, before rupture can occur, the pressure on the viscera must exceed the resistance offered by the ring and neighbouring parts. Persons of sedentary habits are not only more liable to the predisposing causes, consequently the parts less capable of resistance, but they are also liable to some of the exciting causes, such as sneezing, coughing, and straining at stool, which frequently act with greater force than those enumerated as accompanying laborious habits, especially sneezing and coughing, for these mostly happen when the muscles of the abdomen are off their guard.

That muscular exercise, especially in the open air, is conducive to health and strength, cannot be questioned by any one who will compare the country sportsman with the sedentary metropolitan. Labour braces muscular fibre, by pro-

moting full circulation and healthy perspiration, and by stimulating the absorbent vessels to take up the superfluous fluid exhaled throughout the body, for the purpose of moistening it, to facilitate motion. Indolence encourages congestion and diminishes the action of the absorbents, thereby allowing a superfluous deposit of the exhaled fluid, which inevitably produces debility and often disease.

> The first Physicians by debauch were made;
> Excess began, and sloth sustains the trade:
> By chase our long-lived fathers earned their food,
> Toil strung the nerves and purified the blood,
> But we their sons, a pamper'd race of men,
> Are dwindled down to three score years and ten;
> Better to hunt in fields for health unbought,
> Than fee the doctor for a nauseous draught;
> The wise for cure on exercise depend—
> God never made his work for man to mend.
>
> DRYDEN.

It may be said that labour, carried to excess, produces fatigue; I grant it: but rest and the conservative power inherent in all animals, again restores strength; and I suppose this restorative power is not denied to the parts in the neighbourhood of hernia. The amount of exertion

necessary to cause fatigue must depend on habit and constitution—one person would be greatly fatigued by that which to another would be only gentle exercise; at all events it is quite certain that the less we exert ourselves the sooner are we fatigued.*

The system of training men for the prize ring unanswerably proves the benefit derived from exercise and exertion. It frequently happens that these men are removed from the metropolis,

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* When, however, we find that Hottentots and American savages will outrun wild animals in the chase—will pursue and hunt down even deer—that they will accomplish long journeys on foot over the most difficult countries, where there is no path to direct and every obstacle to obstruct their progress; that the effiminate Hindoos, as we frequently call them, will keep up with horses, and perform astonishing journies in a short time; that the South Sea Islanders amuse themselves for hours together by swimming about in the strongest surf, which would instantly destroy a boat or vessel; we shall be obliged to allow that the form and proportions to which we are most accustomed, are not essential to bodily vigour and flexibility of movement. Our own inferiority in these respects arises, I am aware, from want of exercise, not from organic deficiency. Civilized man is ignorant of his own powers: he is not sensible how much he is weakened by effiminacy, nor to what extent he might recover his native force by the habitual and vigorous exercise of his frame.

Lawrence's Lectures, page 341.

previous to an intended battle, in a state of great relaxation, and often of disease, occasioned by their debauched habits, and in a few weeks, by proper training, recovered to the best possible condition.

The wear and tear of the working man's constitution are often erroneously attributed to the quantity of exertion employed as the means of subsistence; a little enquiry and observation will correct this notion, and enable us to find other and more probable causes, amongst which intemperance stands pre-eminent. The frequent potations of ale and porter, besides ardent spirits, which most working men accustom themselves to take, are of themselves sufficient to account for most of their ailments. Those men whose work is what is termed heavy find a ready excuse for such indulgences; they foolishly imagine, or pretend to do so, that all this suction is necessary to support their strength; and the artificial thirst created by habit is, they contend, the call of nature, consequently that exertion which is so powerful an auxiliary to the vis medicatrix, is turned to no other account than partially to resist the effects of this inseparable intimacy between the pot and the mouth.

The thousands employed in manufactories, some exposed to high temperature, some to the noxious effects of impure air, some to unwholesome employments, some only half fed, and almost all accumulated in large numbers in rooms ill ventilated, furnish abundant causes of debility, without referring to excessive labour. An eminent physician lately told me "that ere long cases of hernia would become comparatively rare, because machinery would be universally substituted for manual labour." We know that within the last fifty years machinery *has been* most extensively introduced, therefore less manual labour required; yet rupture has not become less frequent; but, on the contrary, much more so. Fifty years ago there were only five truss makers in London, and I believe not one Truss Society; now there are forty truss makers, and several Truss Societies, many of which societies make annual increases to the number of trusses for gratuitous distribution. The City of London Truss Society, in 1818, gave away 227 trusses, in 1830 4226. How can we account for this extraordinary increased demand for the remedy, otherwise than by the greater frequency of the malady? and yet labour is as-

signed as the principal cause. It is true this great demand for trusses may be partly accounted for by the fact, that the instruments being now more perfect in their construction and the complaint better understood, it is not so much neglected as formerly, yet this admission can apply only to a small extent.

If then sedentary habits occasion general relaxation, the parts in the groin will necessarily become more flaccid; we may expect to find the rings larger, their margins weakened, and, in all probability, a preternatural laxity of the peritoneum; such a condition of the parts is a positive predisposition to rupture, and it only requires some exciting cause to which all are liable, to force the viscera out of the abdomen. On the contrary, if the result of exertion be strength of muscle and tension of fibre, the parts in the groin under these circumstances will be capable of offering (supposing no malformation exits) considerable resistance; and if we consider the anatomy of these parts, the canal being oblique with the openings an inch and half distant from each other, it must strike us as being an arrangement rather unfavorable to the production of rupture by exertion alone, for the

effect produced by the pressure of the viscera downwards and forwards, as is the case in exertion, would be to close the canal by pressing the fascia transversalis against the aponeurosis of the external oblique muscle; besides, the force of such pressure is in some degree neutralized by the elasticity of the intestines from their gaseous contents.

SYMPTONS OF HERMIA.

It is to be regretted that Inguinal Hernia, in its earlier stages, is not usually accompanied by much pain or inconvenience, so little indeed in some cases, that the patient is not aware of its existence until the swelling becomes too conspicuous to be overlooked, and even then, the mildness of the symptoms and the apparent harmless nature of the complaint, often place the patient's life in danger, by inducing him to disregard its first appearance and neglect the means of security, consequently much valuable time is lost, besides a great sacrifice of future comfort; for as the complaint increases, the pressure of the instrument must be greater; the truss that would effectually secure the rupture while confined to the inguinal canal, would be useless when the

complaint has passed the lower ring. When hernia is forming, the patient sometimes experiences a sense of weakness in the part, which is relieved on giving it support by the pressure of the hand, particularly when coughing or sneezing. In femoral rupture the pain is frequently considerable even before any tumour is visible, the pain is more particularly felt when extending the leg, and is relieved by drawing the knees up. If a tumour has formed in any of the usual seats of rupture, which varies in its size or shape at different times of the day, being less in the morning and larger in the evening, or when pressed has a flabby feel, yielding to the pressure of the fingers, or if tense when erect, it is less so in lying down, as also smaller in that position, the probability is that the tumour is a rupture, but if it totally disappears in the recumbent position, and on pressure being applied, does not appear again when erect until such pressure is removed, no doubt remains as to the nature of the complaint. Various tumours have been occasionally mistaken for rupture, but none are so likely to mislead as varicocele ; the first sight of this complaint conveys the notion of scrotal rupture, besides which the tumour

subsides when lying down, and again returns when erect; the distinguishing mark of this complaint, is, that if while the patient is recumbent the tumour is emptied, and pressure made on the abdominal ring, it does not prevent the tumour again enlarging the moment he is erect, and if the pressure is kept on the part for some time, it even encreases in size; this arises from the pressure being insufficient to prevent the blood passing through the artery into the scrotum, but sufficient to prevent its return by the veins, another mark of varicocele is its ropy feel.

PROPER NAMES OF HERNIA.

The term rupture is so indefinite, that without some proper names of distinction, we should be at a loss to convey a just notion of its nature or limits. Certain names have therefore been adopted to distinguish its origin, situation, and contents. Those herniæ passing through the upper opening into the canal, but not passing into the scrotum, are called External Inguinal, Oblique Inguinal, and Bubonocele.

Those passing through the lower ring without traversing the canal, are called Ventro Inguinal, Internal Inguinal, and Direct Inguinal; when

any of the above pass into the scrotum, they are called Oscheocele or Scrotal Rupture. Those which pass from the navel are called Umbilical or Exomphalos. Those in the bend of the thigh Femoral or Crural. If a rupture is composed of intestine only, it is named Enterocele; if of omentum only Epiplocele; if of both, Intestine and Omentum Entero-epiplocele. Herniæ, which take place at any part of the abdomen except the usual openings are called Ventral. The above terms are those in general use, but they are inadequate to convey every peculiarity or variety of the complaint; for instance, in Oscheocele, it is necessary we should know, in order to construct a remedy, through which opening (upper or lower) the hernia first made its escape from the abdomen. To communicate such information we require an addition to the word scrotal as *direct* scrotal and *oblique* scrotal. It is very common with the profession to speak and write of scrotal rupture by the term Inguinal Hernia, and although such application of the term is not decidedly incorrect, at least as far as the origin of the complaint is concerned, yet it is very likely to mislead the mechanic; as, when that term is used, he takes it for gran-

ted, the protusion has not descended into the scrotum. In the report of the cases relieved by the City of London Truss Society, scrotal rupture is not once mentioned, although many thousands of such cases must have been of that description. These are inaccuracies of much more importance than at first sight appears, inasmuch as persons writing from the country, can never expect to obtain an efficient instrument when their cases are so imperfectly described.

OLD OPERATIONS.

Near two thousand years ago hernia was mentioned as a malady of frequent occurrence; but at that time, and indeed up to a comparatively recent period, the complaint was either totally neglected, or where means were adopted for its cure they were so barbarous and inconsistent that those were most to be envied who were entirely left to their fate. It is only by comparison that we can form any idea of the advancement towards perfection made in modern surgery, and none have greater reason to be grateful for this improvement than those afflicted with hernia. In modern surgery it is a

thorough acquaintance with anatomy which gives confidence to the operator ; but in ancient surgery, especially as connected with the radical cure of rupture, the knowledge of anatomy was by no means commensurate with the boldness of the operations. Celcus tells us that the manner of operating, in his time, was to open the scrotum and divide the sac, return the rupture, and having tied the spermatic cord, remove the testicle ; the upper part of the scrotum was then divided, in hopes that by the lips reuniting and forming a solid cicatrix the recurrence of rupture might be prevented. Lanfranc's plan was to cut down upon the bone with a red hot knife, so as to cauterize the os pubis : by which he purposed to join the flesh and the bone so firmly together that the rupture could not again descend. Caustics were also used as a means of cure : the caustic was applied to the skin opposite the ring until the suppuration was sufficient to expose the sac, which was destroyed by the same means ; simple dressings were then applied, and from the cicatrix thus formed the same result, as in the mode mentioned by Celsus, was expected. Another mode of operating was to dissect the sac from its adhesions, and, after returning the

rupture, pass a ligature round its neck close to the ring, the portion of sac below the ligature was then removed, this operation was occasionally successful, but in the majority of cases it either totally failed or was attended with fatal consequences. The intelligent reader will at once perceive that these operations were by no means calculated to accomplish the object in view, for the attention of the surgeon was directed solely to the lower ring, the anatomy of the upper one not being at that time understood;* therefore, supposing the descent of the viscera into the scrotum prevented, no provision was made against its appearance in the groin. To account for the frequent recourse to these painful and dangerous operations, we must suppose that the trusses then in use were totally inadequate to control the complaint, and that supposition is strengthened by the declaration of Arnaud, "That when he was appointed Truss-maker to the Military Hospitals of Paris, the store-houses belonging to those hospitals were filled with trusses which it was impossible to use, because

* We are indebted to Sir Astley Cooper for the discovery of the fascia transversalis.

they were only of three different sizes, and only contrived for one kind of rupture." We may also form some idea of their inefficacy by the description he gives of his own instruments, the construction of which he tells us was remarkably advantageous, though in fact they were of the most imperfect description.

The operations above noticed were performed and sanctioned by persons received in society as regularly educated Surgeons, but they were not the only persons who undertook the cure of herniæ. Castration, as a part of the operation for the radical cure, was performed by travelling quacks and mountebanks, and was so prevalent (one women alone having castrated upwards of five hundred children) that a law was enforced in France about the year 1730 making it felony to practice it. Thanks to modern surgery, these practices have become obsolete, and safer and more gentle means substituted; Surgeons now contenting themselves with the palliative cure by means of trusses, and operating only when life is at stake, as in strangulated hernia.

Notwithstanding the improvement in the surgical treatment of these complaints and the advancement towards perfection in the construction

of the mechanical remedies, the public have not benefitted to the extent that might have been expected. IGNORANCE, FRAUD, and PREJUDICE, are the counteracting agents. *Ignorance* of the afflicted as to the precise nature of their complaint, therefore, an inability accurately to apply the remedy; *Fraud* in those persons who introduce, as novel improvements, old instruments that have been repeatedly banished from surgery from their want of security; and *Prejudice* in those persons who are inventors of really useful instruments, but who, from too fond a conceit of their own work, invariably use and recommend them, to the exclusion of those occasionally more proper.

CONSTRUCTION OF TRUSSES.

These instruments, whether used for the radical or palliative cure of rupture, should be constructed, as far as circumstances will admit, on the joint principle of ease and efficacy. Some trusses are fabricated on the principle of security only, without any attention to comfort; while others are made as though ease were the only necessary quality. It is the indiscriminate application of such trusses that is productive of so much mischief. Trusses may be classed under the terms Elastic and Non-elastic, or trusses with and without springs. The most elastic trusses are those made of sheet steel of different width and thickness, according to the degree of lightness or pressure required. Several sorts of these are now in use, some deserving consideration for their merits, others forced into notice by advertisements. Considerable ingenuity has been exercised to render these instruments more perfect, sometimes successfully,

frequently otherwise; we have at present many useful trusses, and we have also many that have been tried and become obsolete from their insecurity, but again introduced as novel improvements, such are the non-elastic and some of those with spiral springs. The truth is, we are not in want of remedies, but of judgment to select these remedies. For the reader's information, I shall notice and describe some of the trusses now in use, and in so doing I shall readily concede to each any merit it may possess, or condemn any imperfection I may have discovered. It is possible I may err in judgment, but I will endeavour to be impartial.

The trusses I propose to describe, as being in most common use, are—Gawan's Non-elastic Truss, the Old Serpent Truss, Egg's German Truss, Cole's Trusses for Scrotal and for Inguinal Herniæ, Salmon's Opposite-sided Truss, and Adam's Graduated Pressure Truss.

GAWAN'S NON-ELASTIC TRUSS.

This I consider to be decidedly the worst description of truss at present in use. It is quite impossible to state the time of its first introduc-

tion, but probably it is nearly coeval with the complaint it is intended to remedy. It requires very little description, being nothing more than a stuffed belt passing round the body ; to one end of this belt is attached a very thick pad, which is placed over the aperture through which the hernia escapes ; the required degree of pressure is obtained by buckling the belt more or less tightly, and by the fullness or flatness of the pad ; an under strap is attached to the hinder part of the belt, a little posterior to the hip, which passes between the legs to be fastened to the cushion, to prevent it from riding up. The buckles on the cushion rest on pillows, which, by their thickness, give the necessary tilt to the pad and increase the pressure on the ring. As it is a truss I am most decidedly opposed to, I would rather my readers should form their judgment of its worth from the opinions of others, I shall therefore quote Sir Astley Cooper and Mr. Lawrence to prove its insecurity, and Arnaud to show its antiquity; nevertheless I may state that I perfectly concur with their opinions :—

" For this purpose bandages of different kinds and elastic trusses have been invented ; but the

only instrument that can be safely relied on is a truss of steel—all other bandages affording only a false security, more dangerous even than a total omission of this kind of support, since they encourage the patient to take violent exercise without apprehension of the probable consequences. An elastic steel truss, if properly made and well applied, ensures the security of the patient during any degree of moderate exercise, and is no hindrance to any of the common occupations of life."—*Sir Astley Cooper.*

"The different kinds of herniary bandages may be reduced to the two classes of elastic and non-elastic: the latter are composed of leather, fustian, dimity, or similar materials. These cannot be at all depended on, and should therefore be entirely banished from surgery. Since the size of the abdomen varies according to the different states of the viscera and to the motions of its parieties in respiration, a non-elastic bandage must vary constantly in its degree of tightness, and keep up either too great or too little pressure. The omentum or intestine easily slips out when the opening is not exactly closed and the patient who wears such a bandage must be in a state of constant insecurity. Those who lead

an active life, or are obliged to use laborious exertions, will be more particularly exposed to risk. If the patient, after experiencing these defects, endeavours to remedy them by drawing the bandage tighter he may confine the viscera but he produces other inconveniences. The increased pressure injures the spermatic cord and may affect the testicle; the integuments become red, painful, and excoriated, and the bandage must be entirely laid aside until the parts have recovered."—*Lawrence.*

"Some others, as ignorant of mechanics as of the treatment of hernia, have imagined that they removed all these inconveniences by renewing the ancient use of bandages without iron. These machines are so dangerous that the patient cannot be too much prejudiced against them. Their most essential faults are two: first, the heat and excoriation they cause all round the hips by the tightness with which they must be applied, a circumstance which renders them insupportable: secondly, what is still more dangerous, the cushion of this species of truss does not compress the aperture of the hernia, except when the patient stands upright or lies in bed; for when he sits down, the girdle and

a band which passes under the thigh are slackened on account of the relaxation of the muscles, which raises the cushion of the truss on the inferior side and always permits the parts to go and come, for which reason it is absolutely useless : but the danger of it arises from this, that the parts are compressed by it every time the patient rises up, because the cushion, which sat loose when the patient was sitting, constricts them extremely when he rises up. These reiterated compressions bruise and excoriate them, whence troublesome adhesions ensue."—*Arnaud.*

The passage from Arnaud I have selected to prove that nearly a century ago, (for his work was published in 1748), the bandage was old, and although his censure is just, yet had it not been confirmed by my own experience and the opinion of others, I should not have quoted it, for reasons which will be presently mentioned.

THE SERPENT TRUSS.

Or, as it is usually called, "*The Common Truss.*" The spring of this truss is made of

sheet steel, about five-eighths of an inch wide, and sufficiently long to embrace nearly the circumference of the body. The end to which the pad is attached should be slightly curved downwards; the plate, which is made of iron, should be firmly rivetted to the spring and of sufficient thickness to prevent its bending; but it is better when made of tempered steel; the end of the spring most distant from the pad, requiring but little pressure, should be gradually tapered in thickness, beginning about nine or ten inches from the end. The arch of the spring should be made so as to rest between the hip and the head of the thigh bone, in which situation it is least liable to be disturbed by the motions of the body. In covering the truss, it is usual to stitch completely through the stuffing throughout the whole length; this is unnecessary, and renders the truss less soft, neither does it lay so equably on the body, as the upper and lower edge form a sort of cord, an occasional stitch passed through is quite sufficient to keep the leather smooth and free from wrinkles. The under or thigh strap ought to be attached to the truss, about three or four inches posterior to the

centre of the arch of the spring, so as to cross the thigh just below the buttocks. Some of these trusses are made with what is called half and three-quarter springs, the first just reaching to and digging into the middle of the back, the latter reaching a short distance beyond it; but these ought to be rejected as they do not keep their position and are little better than a common bandage. The proper spring is called a "circular spring," and is much more secure, as it embraces nearly the whole of the body. Perhaps no truss has stood its ground better than the Common Truss, and in many cases of rupture it has no equal; the thigh strap, however, which cannot often be dispensed with, is a great drawback to the comfort of wearing it. This description of truss is used by most of the Truss Societies, and numbers are annually exported. The construction of the pad must be suited to the nature of the complaint; it is the want of attention to this part of the instrument that renders so many of them, in other respects well constructed, imperfect. The proper form of pad will be explained when describing the application of the instrument.

EGG'S PATENT TRUSS.

Or, as Mr. Egg designates it, "*Patent Self-resisting and Adjusting German Truss, without Straps.*" Mr. Egg's truss is somewhat similar in shape to the Common Truss; but instead of the spring being made of sheet steel, it is made of bar steel, forged to the shape of oval wire, and drawn out tapering at the end most distant from the pad. The superiority of the elastic spring truss over the non-elastic is, that its elasticity enables it to keep a close though yielding compression on the ring during the alterations of size and different positions of the body; whereas in Egg's truss the spring is so compact that it has very little elasticity, and from the want of this elasticity it is named "self resisting," that is, the compression is constant without any relief. To adjust one of these trusses properly the spring should be set to the exact shape of the body. In shaping the Common Truss it matters not how near the front pad approximates to the back of the truss, but in Egg's truss the spring is set very much open. From the compactness of the spring it requires

great force to open it, it should therefore be so shaped that the distance between the pad and back of the truss is nearly equal to the diameter of the body ; for instance, if the diameter of the body, at the groin, be nine inches, then the diameter of the truss should be eight inches, and the same rule will apply let the hernia be large or small, only that a stronger or weaker spring must be selected, and so selected, that when the truss is on the force requisite to open it to the diameter of the body shall be greater than the impetus by which the rupture is protruded. The supposed superiority of this truss is that it has no disposition to press beyond the one inch. Although it is professed that no straps are necessary, yet in many instances the truss is useless without them. I have generally found these trusses well calculated to support rupture, but they are frequently distressing to wear. I have often seen the parts much bruised by them and I have met with many cases where their use was abandoned in consequence ; I have myself often tried (for experience) to wear them but could never bear one on above half an hour.

COLE'S TRUSSES.

Mr. Cole is the inventor of two trusses; one which he calls his Scrotal Bandage, and another applicable to cases of Inguinal Hernia which have not passed the lower ring. The following is the description which Mr. Cole gives of his scrotal hernia bandage:

"The scrotal hernia bandage has only one spiral spring in the centre of the pad, the girdle has a piece of steel plate stitched into one end, which is screwed to the pad; the pad being placed upon the opening into the purse, is drawn across the neck of the bladder to the hip bone, opposite to the ruptured side, one end of which forms a loop, and the girdle passes through it and is looped to the screw in the pad, by which its pressure is that of a lever acting upon the spiral spring.

"The pad is made to fit the os pubis, and is not intended to press upon the rupture as other trusses do, but merely to close the opening into the purse through which the majority of old ruptures will escape, in defiance of every other truss which has yet been employed to confine them.

"A strap or ribband may be looped to the girdle behind and worn next the body, and buttoned to the drawers and small clothes in front. In case the patient has not a good hip to keep it up, this brace over the shoulder will be found a great acquisition in walking or riding. If the patient wears a flannel waistcoat a loop should be sewn upon the shoulder to keep it in its place."

The same objections that have already been noticed as applicable to Gawan's non-elastic truss may be applied to this, viz. That there is no provision for the occasional difference in the size of the body. So far from this truss being an exemption to those which press on the rupture, it is of all others the most likely to do so, as its particular action is to jamb the soft parts between the os pubis and the pad, in a similar manner to the pipe truss, without pressing directly against the ring, and if the pad does not press directly upon the ring, it must necessarily allow a portion of the rupture to escape. No truss, if made on a scientific principle, has any business below the os pubis; but it is needless to enumerate the defects of this bandage, as the inventor, after eulogising it in every possible way, has himself abandoned, or is endeavouring to abandon its use.

Mr. Cole's truss for inguinal hernia is certainly a much lighter and more useful instrument than his scrotal bandage. The spring of this truss, instead of being made of sheet steel, as most others are, is made from bar steel forged; and as this description of spring has not that elasticity which will be found in those made of sheet steel, the difference is made up by the introduction of a spiral spring. Some of these trusses are made with a three-quarter spring and some with a half spring; the former intended to apply on the opposite side, the latter on the same side, but they both require a strap to finish the circumference of the body. The truss has two pads, back and front: the back pad is round, similar to Salmon's, and rests on the centre of the back; the front pad is similar in shape to the Common Truss, the spiral springs are placed on each pad, and causes the yielding resistance spoken of by Mr. Cole: these spiral springs are worse than useless, as they render the instrument unnecessarily complicated. Mr. Cole's says :—

"This truss does not merely possess a self-adjusting movement, but that which is of infinitely greater importance, a yielding resistance

to the descent of the rupture. The strap is brought round the body and looped to the screw-head of the front pad, which gives it a degree of firmness necessary to the security of the patient without drawing the pad from the rupture, which is always the case with *other* self-adjusting trusses."

I cannot see the necessity, nor do I approve of the motive, of extolling his trusses at the expence of all others. We have seen that his scrotal bandage, which for a long while was blazed forth as so superior to *all others*, has positively been abandoned by its inventor, while those *others* are at the present time in constant use; nevertheless Mr. Cole's Inguinal Truss is one that may be worn with advantage in oblique inguinal hernia which has not descended into the scrotum.

ADAM'S GRADUATED PRESSURE TRUSS.

This truss is made of sheet steel, about five-eighths of an inch wide, and furnished with a regulating spring, which slides in a groove cut through the middle of the main spring. The instrument is strongest when the regulating

spring, which is straight, is nearest the back cushion, but as it is pulled over the arch of the main-spring, towards the front end, the pressure of the truss is lessened. The supposed advantage of this construction is, that the wearer may lessen or increase the pressure at will, without removing the instrument. The objections to this truss are—first, that the main-spring is so weakened by the groove cut in it, that it is very liable to break; secondly, that the force necessary to slide the regulating spring, especially when it has contracted rust, is sufficient to displace the whole machine; and, thirdly, that the regulating spring totally alters the shape of the truss, which more than counterbalances any utility it might otherwise possess, for if the instrument fits properly when the regulating spring is near the back cushion, it fails to do so when the same is drawn over the arch of the main-spring. Setting aside the nonsense about graduated pressure, the instrument may be worn in inguinal hernia; and, if altered to suit circumstances, in scrotal hernia also.

SALMON'S PATENT SELF-ADJUSTING OPPOSITE-SIDED TRUSS.

The spring of this truss is made of sheet steel of different widths, from three-eighths to five-eighths of an inch, and of sufficient length to embrace about three-fifths of the body. The front end of the spring is attached to the cushion by a ball-and-socket joint, having motion every way. The truss is called "Self-adjusting," because it retains its situation on the body without the aid of any strap: "Opposite-sided" because the spring is, contrary to most trusses, made to apply on the opposite side to that on which the complaint is situate; that is to say, if the complaint be in the left groin the spring must be placed just below the right hip, and the front cushion brought across the centre of the body and placed with its lower edge resting on the os pubis, and the word TOP pointing towards the hip; the back cushion should be placed exactly on the centre of the back. If the complaint be in the right groin, the same truss will equally apply, but the spring must be placed just below the *left* hip and continued across the body to the seat of the complaint. The attach-

ment to the spring of the pads is so arranged as to allow and accommodate the various motions and positions of the body, without disturbing the points of pressure. It is also capable of increase and decrease of size and strength. The size is regulated by the additional holes at each end of the spring. The pressure is increased by the introduction of a second spring, which is placed on the out-side of the main-spring, and the covering or leather case secures them firmly together.* [See Plate V.]

This truss is in very general use, and I consider it is the one approaching nearest perfection. Among its numerous good qualities, its simplicity is conspicuous. No strap is requisite to keep the instrument firmly fixed; every motion of the body is accommodated, and if the truss fits properly, there is no pressure on the hip. Some have supposed this truss only fit for slight cases, in answer to which I need only state that Mr. D——'s hernia was supported from the first by one of them. The cases where I have found these instruments fail are, in direct inguinal hernia, especially if only on one side. In persons who have no fall in the back, or when the

* The application of Salmon's *Double* Truss is shewn in Plate 6.

os sacrum happens to be situated very high in relation to the os pubis, and in persons having a prominent os pubis and flat abdomen. In the first case an under strap is indispensable and cannot be used with the opposite-sided truss; in the second case the back pad will inevitably slide down and the truss fall off; and in the third case the front cushion slips up and allows the rupture to escape. I have also found these trusses occasionally objected to from the direct pressure on the back.

There are other kinds of trusses occasionally in use, such as the pipe truss, the bellows truss, the rack truss, &c. &c., but as they have become nearly obsolete it is needless to describe them.

A truss is occasionally advertised by a Mr. Packman, of Maidstone, as an improved instrument. It is on Salmon's principle, but with the exception that the ball and socket are removed, and the front end of the spring, which has a groove of about an inch long, slides upon a collet, in other respects it is precisely similar to Salmon's—in fact it is that gentleman's invention deprived of its most useful property.

In the foregoing account of the various trusses in use, I have described them as they are usually

made, but they are each capable of certain alterations in the front pad, which ought occasionally to be made to suit the peculiarities of the complaint. I must repeat, that it is for want of attention to this part of the truss, that so many of them, in other respects well constructed, are found to be defective. The proper construction of the front pad will be particularly noticed when explaining the proper application of the instrument.

APPLICATION OF TRUSSES

AND CONSTRUCTION OF THE FRONT PAD.

That persons who undertake the management of ruptures should be acquainted with the anatomy of the complaint as well as with the construction of the remedy, is an axiom readily admitted. That it has not been hitherto practised I am about to shew:

To assert that any one truss will answer every variety of hernia, is as empirical as to advertise a nostrum for the cure of every disease; and the practice of recommending one shaped pad in particular for general use, as unreasonable as

an arbitary law of diet for every stomach. It is not sufficient that a truss maker should be an ingenious mechanic—that is only a part of his business: he ought to acquire a perfect knowledge of the anatomy of herniæ, and be well acquainted with all their varieties, so that on examination, he may be able to ascertain the precise nature of the evil, in order that he may construct a suitable remedy. It may be said that this would be an encroachment on the province of the Surgeon, and that the person who ventured to profess such knowledge would obtain but little patronage from the Faculty. In some instances this might be true, but few Surgeons of liberal education and liberal principles would condescend to entertain for a moment such ridiculous jealousy; they would rather encourage such persons as being the most likely to benefit their patients. We can hardly expect that Surgeons can spare time to learn the mechanism of trusses, and yet while the knowledge is divided, the public cannot benefit to the extent they otherwise might. Some branches of the profession have been monopolized to the advantage of the public. We have Occulists, Aurists, and Dentists. Surely the healthy condition of the abdo-

minal viscera is of equal importance with that of the teeth. At present Surgeons are satisfied with acquiring a knowledge of the complaint, the truss maker with fabricating the remedy. Would a sick person, if he knew it, consult a Physician who understood pathology, but was ignorant of pharmacy, or seek relief from an Apothecary who, though clever in the science of pharmacy, was totally unacquainted with pathology? In reasoning thus it is far from my wish to give the slightest offence to the profession, many of whom are my most intimate and best friends; but as we have no reason to expect that Surgeons will condescend to become mechanics, truss makers, if the public welfare is to be considered, must presume to become anatomists, at least as far as hernia is concerned; but the public also should acquire some knowledge of the complaint to enable them to judge when they are under skilful persons, and likewise to enable them properly to apply the remedy.

A century ago Arnaud considered rupture as one among the catalogue of maladies of sufficient importance to claim his particular attention, and we are told by him, in his dissertation on ruptures, that he made it his particular study, not

only with reference to the complaint, but also to the construction of the remedies. That he was successful in acquiring a knowledge of the complaint as far as it was then understood, is proved by his work on hernia ; by the high respect paid to his opinion by his contemporaries, and by the estimation in which his works are held even at the present day, as Surgeons frequently quote him as high authority. That he was unsuccessful in the construction of the remedy will be proved by his own words. When describing the truss he himself recommended, he says, pages 179 and 181,

"Though I call them steel trusses, it is not necessary that they should be of pure steel, since this substance, being too brittle of itself, would not have pliancy enough to be bent any way according to the necessities of the patient; iron, on the contrary, would be too soft, and consequently incapable of retaining the figure the truss ought constantly to preserve in the different attitudes and motions of the body. It was therefore necessary to find a substance which partook of both these qualities, which was neither too brittle nor too soft. This substance is a composition of steel and soft iron joined

and forged together, till they acquire a consistence which is solid, elastic, and incapable of losing its form. This condition or property of the truss, which is very simple when we know how to give it the figure it ought to have, is not only the most considerable and necessary, but also that which is generally wanting in all the trusses made by the common workmen in that business, who are neither acquainted with anatomy nor the proportions of the body. In order to render it perfect, the Surgeon who applies it must know how to give it the proper bending: neither can he succeed in this, unless to great experience in managing these machines, he adds a perfect knowledge of all the different species of herniæ."

I think it must be evident to the reader that a truss so constructed that it could be bent by the hand of the Surgeon to any shape he wished would not long retain that shape; neither would there be much, if any, elasticity in such a spring, therefore there could be no pressure on the ring further than what the instrument effected as a mere bandage, and such a truss was in no way superior to the non-elastic bandage spoken of by Arnaud in such

severe terms. It was for this reason I quoted him to prove the antiquity only of the non-elastic bandage. But Arnaud fell into a worse error than the unhappy construction of his truss, namely, the extreme jealousy he evinced towards every improvement suggested by others. The elastic *steel* trusses now in use were introduced in his time, but whether he really was so ignorant as not to see their superiority, or, which is more probable, resisted their introduction, from the fear of their eclipsing his own nursling, I know not; but they were immediately cried down by him, and his opinion was received with such implicit faith, that they did not come into general use until long after his death, an incident among many others I have noticed, confirming the fact, how difficult it is to erradicate errors propagated and supported by eminent men.

Since Arnaud's time we have had several writers on hernia, but from none can be gleaned much information as to the proper construction of trusses. A modern author, in describing what he conceives to be the best form of pad, says :—

"Various inconveniences arise from the common fault of making the pad too convex at

its middle part, the elevated centre pressing strongly, while the circumference has a very slight bearing, the parts may easily escape at the sides, particularly under a slight derangement, which is a very probable occurrence. Moreover since the force of the spring must be exerted almost entirely on one spot of the pad, a moderate degree of pressure quickly becomes painful. If the pad be flattened it applies equally throughout, and the action of the spring is distributed over its whole surface, it will not produce pain, even although the elasticity of the bandage be considerable. A too convex pad may also be injurious when accurately applied by pressing the external soft parts into the opening; thus keeping them distended and preventing that contraction on which a radical cure depends. Its partial and considerable pressure may separate the tendinous fibres near the ring, and thus facilitate a second protrusion. We must not, however, run into the opposite error of making the pad too flat elevation in the circumference is not only useless, but actually injurious. Pressure on the spermatic cord would be a probable effect of such a construction."

Now the fact is that each form of pad above

mentioned is occasionally the best. Were every case of rupture alike, it would be reasonable and proper to adopt that form of pad which from experience was found to be the best; but while so many varieties of the complaint exist, and so many peculiarities by which we must be governed occur, it becomes necessary that the pad should be constructed accordingly: hence the error in attempting to establish one particular form of pad for general use.

In the application of the Common Truss the pad is placed just above the pube bone, and secured in that situation by the under strap, or what is usually called the thigh strap. Attention to the form of the pad is of the greatest importance, as on it depends the security and comfort of the wearer. To secure the rupture is of course the first consideration, the comfort of the patient the second. Some ruptures are of that description that we are necessarily obliged to use that form of pad which it is painful to wear; others are so easily secured as to leave us at full liberty to choose the easiest form of pad. If the reader will refer to the anatomy of inguinal hernia, he will find that the lower ring is close to the os pubis, indeed that bone

forms the base of the triangular slit, that the upper ring is distant from it one and a half or two inches, upwards and outwards; and that the spermatic cord, in passing through the lower opening into the scrotum, must necessarily be close to the bone. It is true it does not rest on the bone but (the aperture being oblique with the apex pointing towards the hip) on the external column of the ring, namely, pouparts ligament. From this description it will appear desirable that the pad should be so constructed as to secure the rupture, without subjecting the spermatic cord to pressure. I should say that in every case of external inguinal hernia, where the natural distance of the rings is preserved, a convex pad will be found to answer best, for these reasons, that such a pad most effectually closes the canal and upper opening, and is more likely to produce a radical cure; that less risk is incurred of bruising the cord; that it is less in the way in stooping or sitting; and that it is much the easiest form of pad to wear.

The observation, that a too convex pad may be injurious, by pressing the soft parts into the opening and thereby preventing its contraction, on which a radical cure depends, can have re-

ference only to a possibility. If the adipose substance between the skin and the muscles was in contact with the upper ring, such an occurence might be likely, but as the tendon of the external oblique is the part really next the opening, many facilities must occur before that could be forced into it, the parieties must be extremely relaxed, the pad small and very convex, and the pressure considerable; whereas great pressure is rarely necessary with a *convex* pad, and when it is necessary little hope exists of a radical cure in the adult.

If the hernia be internal inguinal, in which case the contents pass direct from the abdomen without traversing the canal, elevation in the centre of the pad would render it useless, because in this case we require the pressure close to the bone; here then we must apply a flat pad or as is sometimes necessary, one with an elevated circumference. When the case is external inguinal hernia, but the upper ring has approximated towards the lower one, thereby shortening the length of the canal; so far as this has taken place must the convexity of the pad be lessened or removed. In some cases the most secure pad is one that is convex at the extreme end and

lower edge of the pad. The difference, in point of comfort, between a flat and convex pad is proved by the frequent complaints made by patients of the former, and the relief they experience when the latter is substituted. It may also be easily understood by description. The convex pad, by its circumference pressing but slightly, leaves the spermatic cord free from the risk of injury; the flat pad, on the contrary, is very liable to bruise the cord by jambing it between the bone and the lower edge of the pad, especially when sitting or stooping, and this pressure on the cord is still more constant when an understrap is worn. (Vide fig. 1. Plate VII.) So severe sometimes are the sufferings produced by this pad, that no persuasion will induce patients to continue using it even when necessary; how improper then to apply it when an easier one would be more useful, and yet all the poor supplied by the City of London Truss Society are indiscriminately subjected to the evils produced by this pad, the Society use no other; their patients frequently throw the truss aside and allow the rupture to take its course, because they cannot bear the pain it causes. I do not wish it to be understood that the trusses

used by the Society are bad, either as regards kind or quality. No just complaint can be made against the quality; and, as regards the kind, I have already stated that no truss has stood its ground better than the Common Truss, and that in some instances it has no equal. The point upon which I am at issue with the Society is, that they, contrary to reason, invariably use one sort of truss and pad only, while so many varieties of the complaint occur.

Patients may themselves ascertain the sort of pad proper for them to wear, by pressing with the fingers (after returning the rupture) close to the bone and gradually drawing them upwards and outwards, namely towards the hip, using at the same time some little exertion such as coughing or straining, until the rupture escapes below the fingers, by this they will ascertain whether the aperture through which the rupture protrudes is near the bone or some distance from it, according as this is the case they will select the form of pad as before explained. The experiment should be made while in the erect position.

A very frequent cause of the failure of trusses is the careless and slovenly manner in which patients themselves apply them, especially if

the rupture has descended into the scrotum they are too apt to place the truss where the rupture passes to, instead of where it comes from. In every case of oblique inguinal hernia the pad should be placed above the bone; in direct inguinal hernia it should rest upon the top of the bone, and be secured in that situation by the under strap. If the instrument is placed lower than this, which is mostly the case, it fails to have the desired effect, as the bone prevents the pressure of the instrument falling on the ring, besides which the spermatic cord is incarcerated between the pad and the front of the bone, and subjected to the risk of considerable injury. Another species of neglect is the persevering in the use of an instrument which is insecure, even when accurately applied. It is really surprising to witness the apathy evinced by some persons; they appear to suppose that if they only wear a truss, it matters not whether the rupture be in or out of the abdomen; the consequence of this neglect is that their ruptures are very liable to become ultimately unmanageable, as the instrument pressing on the rupture, is a source of irritation very likely to cause adhesion. Those who are more clever in managing their ruptures

will hardly credit that any one can be satisfied with an insecure instrument, but those whose province it is to manage these complaints have too many opportunities of witnessing such cases. I do, therefore, strenuously advise every person wearing an insecure truss to exchange it for another, persevering until he obtains the desired object; for he may rest assured that the longer the rupture remains uncontrolled the greater will be the difficulty in the end to secure it.

TRUSSES FOR INGUINAL HERNIA.

If the case is external inguinal hernia and the protrusion has not descended into the scrotum, almost any kind of elastic truss, if well made and properly fitted, will secure the rupture, and in such cases we have full liberty to study the patient's comfort. Salmon's truss made to fit well, will be generally found to be the most comfortable, or one of Cole's Inguinal Trusses may be worn with advantage, or the Common Truss with a convex pad; indeed, in mild cases like these the patient may make his own choice, selecting that which he thinks will incon-

venience him the least, but bearing in mind that, when there is great general relaxation, the pad must be rather large. If the complaint has descended into the scrotum, one of Salmon's may still be applied, only the pressure must be greater, and the point of pressure placed nearer the bottom of the pad, or the Common Truss may be applied with the alteration in the pad suggested a few pages back. Egg's Truss may also be applied in these cases, if the patient can wear it with comfort. If the case is direct inguinal hernia, a Common Truss, with a flat pad, will generally be found the most secure; but as the protrusion in direct inguinal hernia descends immediately into the scrotum, and great difficulty is frequently experienced in securing it; it is impossible to lay down any decided rule for forming the pad; we must be governed by the nature of the difficulties which arise.

TRUSSES FOR UMBILICAL HERNIA.

It is a very common error to suppose, that in this sort of rupture, bandages without springs are admissable, elasticity in the instrument

being as indispensable in this as any other kind of rupture ; that instrument is the most perfect which secures the complaint, without pressure on the circumference of the body ; for this purpose the truss on Salmon's principle may be used, the spring of which is semi-circular, with a pad at each end, one in front to secure the rupture, the other resting on the spine, and the whole secured by a band passing from the back to the front cushion ; or the truss on Mr. Eagland's principle may be used ; it is a very neat and secure instrument, and is particularly calculated for children. This instrument has two semi-circular springs attached to the front pad by hinges ; the back end of the springs is furnished with quilted cushions which rest on each side of the spine ; these ends are secured together by means of a strap and buckle or strap and stud. I have latterly used a truss which for adults I think is an improvement : this truss is likewise composed of two semi-circular springs, with three holes at each end, to lengthen or shorten it ; the back ends of the springs are attached to a cushion by means of screws, yet allowed to have motion. In the front ends of the springs the holes are oval and drop over

studs, placed in the front cushion, by which the whole is secured. The springs of this truss fit close to the body, and are capable of motion without disturbing the pads, the points of pressure being before and behind; it is much superior to Salmon's Umbilical Truss, in as much as its having a spring on each side, renders it more secure and steady on the body. Sometimes it is difficult to prevent the Umbilical Truss from slipping up or down. This is often the case with children who have prominent bellies. If the navel is above the apex of the belly, the truss slides up, if below the apex, it slides down; this defect can be remedied only by means of straps. In all cases where the navel is depressed, an ivory cone should form a part of the front pad, the cone should be made to fit the concavity of the parts so accurately, that although it prevents the least protrusion, it should by no means enter the ring. Stuffed cones are sometimes used, but ivory ones are much to be preferred, as they may be highly polished, and do not cause friction, neither do they, like the stuffed cone, generate heat, besides the latter absorb the perspiration and become foul, which is of itself sufficient to cause excoria-

tion. Cones built on spiral springs are highly improper, the action of the spiral-spring produces friction and allows the rupture to pass in and out, instead of constantly confining it within the abdomen. In very lusty persons the abdomen alters in shape, in different positions of the body; when the patient is sitting the lower part of the abdomen rests on the thighs, and the whole is pushed upwards, this affects the security of the instrument, for the front pad, instead of pressing horizontally and equally, as it did while the patient was erect, will press obliquely upwards or downwards, as the position happens to affect it; in either case the cone, being fixed, follows the direction of the pad, and does not then properly fit the concavity of the navel. A moveable cone, on an universal joint, will remedy this defect. When these cones are large they should be made hollow, as otherwise their weight would be objectionable. In irreducible rupture a plate cupped according to the size and shape of the tumour should be used.

TRUSSES FOR FEMORAL HERNIA.

When the situation of this rupture is considered, it will be readily admitted that some ingenuity is requisite to make an instrument rest steadily on the part. As long as the body is erect the truss will remain secure, but when the thighs are brought at right angles with the body, as in stooping or sitting, the truss is more or less likely to be disturbed according as it fits properly or not. The spring of this truss should be more curved downwards than the truss for ingunial hernia, and the pad should be as small as possible consistently with security. A large pad is much in the way, and more likely to be displaced. The pad should also be more convex than is usual with other trusses, so that it may fit into the hollow or bend of the thigh; but, above all, great attention should be directed to its fitting accurately. Salmon's Patent Femoral Hernia Truss, Cole's Femoral Hernia Truss, or the Common Truss are each, with occasional modifications, of that construction applicable to the support of femoral rupture. It is sometimes necessary, as in umbilical rupture, to apply a cupped or hollow pad.

THE RADICAL CURE OF HERNIA IN CHILDREN.

The same means which in the adult operate palliatively in children operate radically, viz. the application of trusses. In the adult we are content if the remedy secures the hernia from protruding, but in children we always anticipate, and if they are properly attended to, succeed in the radical cure. A very mistaken notion is entertained by some persons that a steel truss should not be applied before the child is of a certain age : some recommend to wait for six months, others for twelve months after birth, and in the interim to use the non-elastic bandage. Nothing can be more fallacious than this practice. I have applied the truss on Salmon's principle to hundreds of children only a month old, and I have invariably found that the younger the child was when the instrument was applied, the more readily the cure was effected.

CASE V.

Mr. Hovell, Surgeon, Clapton, called upon me to ask what I would recommend in the case of a weakly child five weeks old, who had hoop-

ing cough and a very large double scrotal rupture; I immediately proposed a steel truss. The day following the child was brought to me, and I applied a double truss on Salmon's principle, which is the only sort I use for very young children. The truss was worn constantly, lifting up the pads occasionally for the purpose of putting clean linen under them. In two months the child had increased so much in size that the instrument became too small, but as the parents had never seen the rupture since the truss was applied, they did not think it necessary to incur the expence of a second one, which ought to have been done, however it appears the child is perfectly cured, as it is now four or five years old, and the rupture has not since appeared.

I have selected this case, as a very unpromising one, cured in a surprising short time by the application of a steel truss, and I would ask what would have been the consequence had this child been temporised with by applying the non-elastic bandage? The cure of hernia in children is frequently much retarded by the affectionate solicitude of the mother. If the pad excoriate the skin, the pad is immediately removed, and the hernia allowed to remain down until the part

is healed; a repetition of this practice totally prevents the cure, and in the end the child suffers more than if the truss had been kept on. It is but reasonable to expect that children, always disposed to chafe, should suffer in a greater degree when a truss is applied. The pad, by constantly pressing on one part, prevents the evaporation of heat; of itself sufficient to make the skin tender, besides which the instrument is frequently wet with the urine. When the parts begin to excoriate, they may be washed with fuller's earth water, made thick; if considerable excoriation has taken place, dressings may be applied under the truss in such a manner as to relieve that part which appears to have suffered most from the pressure. It is generally the upper and lower edges of the pad which are most likely to cause excoriation; for when the child draws its legs up the lower edge presses against the thigh and the upper edge against the brim of the belly. In those herniæ which have been neglected until they have become scrotal, and for some time afterwards, we have every reason to expect, from the pressure then necessary, that the truss will produce some mischief to the parts, and it often becomes a question with parents

whether it is most advisable to neglect the hernia or submit to the injury caused by the truss ; but in the milder form of rupture, excoriation to any extent rarely occurs, unless the child is neglected. The greatest attention should be paid to keeping the parts perfectly clean and dry; the napkin should therefore be changed immediately it is wetted and pieces of clean soft linen introduced under the pads of the truss, these pieces of linen may be doubled three or fourfold, and larger than the pads, so as to intervene between their edges and the skin. In very young children the truss is always wet; a strict observance of the above management is therefore indispensably necessary. Those to whom expense is not an object should have a second truss to put on while the other is being cleansed and dried.

OF THE RADICAL CURE IN ADULTS.

It is the opinion of some Surgeons, that even in the adult an inguinal hernia may be cured by wearing a truss without intermission for two years. No doubt some radical cures do take place even where the truss is not so constantly

worn; and previous to the full development of the person we may expect such a result, but after the age of puberty it is quite uncertain, particularly in ruptures caused by predisposition. In slight cases of rupture, we are contented with recommending the instrument to be worn in the day only, taking it off *after* lying down and putting it on *before* rising, unless any reason exists to the contrary. The practice of recommending a truss to be constantly worn for a definite period, with a view to a radical cure, is often productlve of serious consequences. The patient, on the faith of such recommendation, wears the instrument for the time stated; but can the Surgeon ascertain that a radical cure has taken place? And suppose it has not and the truss be laid aside, is not the patient constantly liable to a fresh protrusion, and under circumstances of great peril? For should the rupture again pass the contracted ring, is it not very liable to become strangulated? These are not speculative fears: I have myself seen several cases of strangulated rupture which have been caused by this mode of practice; and have been informed by Mr. Coulson, Surgeon, of Frederick-place, Jewry-street, that he had frequently operated in

similar cases. Besides, there exists no reasonable motive for such practice; the rupture likely to be cured by it may be secured by a truss, causing so little inconvenience that it would be folly to make the experiment, if done with the view of entirely leaving off the truss. The usual practice in surgery is, not to hazard any experiment, unless the sufferings or inconvenience of the patient demand it. There is also a little inconsistency between the above practice and that of leaving large scrotal ruptures, which are generally a source of considerable uneasiness, to the mere support of a suspender. Any experiment to better the condition of large herniæ is more justifiable than incurring the least risk by the attempt to cure small ones.

That the Surgeon cannot always decide correctly whether or not the cure is complete, I could prove by numerous cases; and I may further state, that he cannot always detect the presence of hernia, even where the truss has been worn only a few days. I repeat that I do not intend to deny that radical cures do occasionally take place, and that partial cures very frequently occur, I am constantly observing; but I am

about to shew that it is sometimes impossible to decide by examination whether the cure is complete; and that if a wrong opinion is formed by the Surgeon and acted upon by the patient, his life may be placed in danger. The cure of hernia is effected by the truss keeping the sac empty and admitting a chance of its sides cohering, or in recent cases, when the adhesion is but slight, a spontaneous reduction of the sac may take place, or the pressure of the truss may cause a contraction and thickening of its neck and mouth sufficient to obliterate the passage from the cavity of the abdomen. Hence the necessity, where a radical cure is attempted and expected (with children, for instance), of constantly wearing the truss ; for should the rupture escape, it of course again distends the sac and prevents or delays the cure : the truss also appears to consolidate the whole of the parts subjected to its pressure, for it is often found, upon examining patients who have worn a single truss for some time, that the ruptured side has a much firmer feel than the side where a truss has never been worn ; and we might often be misled were we to judge from these appearances, and fancy that the afflicted side was the soundest of the two.

In the early part of the year 1831 I applied a truss to a man for double inguinal hernia, which was worn up to May, 1834, at which time there was no appearance of hernia, and the parts in the groin appeared particularly firm. The patient had occasion at this time to consult his medical attendant for an abscess in the thigh, who noticed his wearing a truss and desired to see his rupture; when the truss was removed he examined the parts, and came to the conclusion that the rupture was cured, and advised the truss being left off, as it was unnecessary to wear it any longer. This advice was very readily followed, for the instrument required repair, and of course that expence was thought useless; however, in July, 1834, the patient went into the Hospital with, and was operated upon for, strangulated hernia. I have no wish to hint that in this case the Surgeon displayed any want of skill, for had the patient put aside his truss, and kept it a secret that he had ever had rupture, he might have consulted twenty Surgeons, and they would all have told him he did not require a truss; but the fact of his having had rupture ought to have induced the Surgeon to be more cautious than to advise the truss to be laid aside.

Some time since, Mr. Johnson, Surgeon, of Church-lane, brought a patient to me with single scrotal hernia recently formed. I had considerable difficulty in returning it, and after it was returned, it did not appear disposed to reprotrude. A double truss was applied, not for any rupture on the other side, but as a preventive, the patient frequently using great exertion. A few days after, I learned from Mr. Johnson, that the patient had previously been under the care of another gentleman in his neighbourhood, who had treated the case as enlarged testicle, and who still persisted in asserting that no rupture existed. What he could suppose the tumour to be, which one day he considered enlarged testicle, and the next day found removed, is best known to himself. By the wish of his employers, the patient was taken to a consulting Surgeon, who gave an opinion that he was not ruptured, nevertheless about a week after the rupture again descended, and convinced all parties as to the nature of the complaint and the necessity of again applying the truss which had, up to the time of the second protrusion, been laid aside. I was not at all surprised at the opinion given by the consulting

Surgeon, for, on examining the patient the day after the rupture was first returned, there certainly was no appearance, either to the sight or feel, which could indicate the presence of hernia, and I am not aware whether the circumstance of a tumour having been so recently returned from the scrotum into the abdomen was mentioned. If we were warranted in attempting the cure of hernia in adults, with a view to relinquish the use of the truss, it would be in those cases which appear to have been suddenly produced by exertion, and which had been immediately returned and protected by a truss, but even in such cases it is more prudent to continue the use of the truss than hazard the recurrence of the complaint. A knowledge of these facts will be useful to the patient, by warning him against laying aside his truss, supposing the cure complete, and may be useful to the younger branches of the profession, by cautioning them against forming too hasty or premature an opinion.

DOUBLE RUPTURES.

By the term Double Rupture we mean two of a sort, as a double inguinal, or double femoral hernia. Double inguinal hernia is very common, for taking the aggregate number of those afflicted with inguinal hernia, I should say that two out of five had double rupture. The same cause which produces the complaint on one side will influence the descent of the viscera on the other; but the right side appears to be more liable to the complaint than the left. In 18,765 inguinal ruptures, 11,641 were on the right side, and 7,124 on the left side. No satisfactory reason has yet been offered to account for the great proportion of hernia on the right side, but it has been supposed to arise from the more frequent use of the right side in bodily exertion; yet in 2,091 persons of sedentary habits, therefore not exposed to the above cause, 1,385 had right inguinal hernia, and 706 left inguinal hernia. However, let the cause be what it may, no great benefit can be derived from the knowledge of it.

As a great proportion of hernia arises from predisposition, we frequently find, on examining patients who have single rupture, a disposition

to the complaint on the other side. When this is the case a double truss should be applied, as by doing so we may prevent its occurrence. This is rendered more necessary, as the securing one rupture often becomes an auxiliary cause to the production of another ; for while the rupture is uncontrolled the force of the compressed viscera is diverted from the sound side by the ruptured one yielding more readily ; but when the rupture is secured, the force is restrained on that side and directed to the other. The wearing a double truss, if not positively necessary, can do no harm ; besides, a person wearing such an instrument will have more confidence when using exertion than if he wore only a single one.

I have already explained that as varieties of the complaint happen in different individuals, it is injudicious to adopt any particular truss or form of pad. In double rupture we are frequently obliged to use two sorts of pad, for we rarely find, except in recent herniæ, both sides alike. On one side the canal may be partially or wholly destroyed by the approximation of the rings, while on the other side their natural distances may be preserved, such a case would require the sides of the instrument to be con-

structed differently, both with respect to the form and size of the pads, and the pressure of the springs, hence the necessity of persons who write to order trusses being particular in explaining their case.

TO TAKE MEASURE.

The proper measure for trusses is the whole circumference of the body, all these instruments being made according to that measure. For inguinal aud femoral herniæ, the measure should be taken one inch below the hips; for umbilical, it should be taken in a line with the navel. Persons who reside in the country should not only forward the particulars of their case, but they should also mention their shape, whether round or flat made, or if very thin, as the spring to fit properly must be shaped accordingly; but it is better, if possible, that the truss maker should apply the instrument himself, as he can readily detect and remedy any defect it may possess.

CONCLUSION.

If in the preceding pages, I have given a preference to some trusses above others, it is because I have found, by experience, such trusses to be more generally useful, but let it be remembered, this preference applies to them only as far as their utility extends. For instance, Mr. Coles's truss is to be prefered to Mr. Egg's in point of comfort, and should have the preference in all cases of external inguinal hernia that have not passed the lower ring; but in cases of scrotal hernia, Mr. Egg's truss has a superior claim from its greater security; while Mr. Salmon's truss is in most respects superior to any, its principle combining comfort with security; yet the Common Truss is in some cases more useful than any other, and even the Non-elastic Truss has its supporters. Inventors and advertisers of individual trusses of course consider their own truss the best, consequently they use no other sort, by which exclusiveness the patient is frequently a sufferer.

I have often been asked to explain or reconcile the diversity of opinion among the profession as regards trusses, for we find every truss

advertised has some professional support, and even certificates from medical men of their individual superiority are published. My answer has been that it is reconcilable, by supposing that such gentlemen had supposed them generally more useful from having tried them in cases where they were particularly applicable, and this diversity of opinion confirms the position advanced, that no truss yet invented will succeed in every case of hernia. There always has been difference of opinion respecting trusses, even when they were much less numerous ; and Surgeons not only differed about trusses, but also about the length of the spring, as we find in some works on hernia controversies for and against the circular spring of the Common Truss. Scarpa says, " For although Surgeons generally agree among themselves with regard to the preference to be given to the elastic over the inelastic bandage, yet with respect to the elastic they differ about the length of the spring and form of the pad."

The knowledge of these controversies and diversity of opinion respecting the merits of individual trusses is only useful to the patient, as it shows him that he may be, and is very

likely to be misled, the question which interests him most, is not whose truss is best, but which truss is most proper for his case; and if professional certificates are to have any weight or influence with the patient, he should rather be guided by those which certify to the skill of the artisan, than those which praise the instrument.

I think I have by this time proved that a truss may possess many valuable qualities, and may be usually found very useful, and yet fail in its adaptation to some cases of hernia. I shall, therefore, now only add two or three cases where impediments, unconnected with the rupture, occasionally arise to baffle our efforts in the attempt to protect the complaint with some degree of comfort to the sufferer. These hindrances generally proceed from some idiocrasy of the patient, and disable him from bearing the necessary degree of pressure, or from using the common sort of pad. It will, however, be proper to premise the description of such cases by stating that in our endeavours to confine hernia, the pressure of the truss should invariably be greater than the impetus, which causes the tumour to protrude, otherwise we only temporize with the complaint and place

the patient in positive danger, for unless the instrument is of sufficient strength, it will inevitably allow the hernia to escape, and incarcerate it between the pad and the bone. This caution is very necessary, as the application of trusses of less than the requisite pressure is sometimes recommended with a view to accustom, by degrees, as it is said, the patient to bear the necessary pressure. I need not comment on such advice, as it must be evident that it can answer no useful purpose, but is likely to be very mischievous in its effects, besides patients can better endure strong pressure with the hernia controlled, than slight pressure with the hernia unsecured, and it is preferable to try every other expedient rather than apply too weak a truss. The most common obstacles to the application of the truss are an irritable state of the glands and of the skin. I have at this time many patients whose cases are similar, as far as peculiarity of constitution and the nature of their herniæ, but whose cases appear to require very different remedies, and so far, they are complete contradictions. From several very troublesome cases of femoral hernia, where an irritable state of the glands exists, I will select

two as illustrations. The one of a female, with a hernia about the size of a walnut, who for a long time experienced the most painful inconvenience from the trusses she had worn, although many of them were of very slight pressure, being constantly laid up with the glands in the upper part of the thigh inflamed and enlarged. When she applied to me, I tried every sort of truss likely to answer, and every kind of pad, even an hydrostatic pad, and a pad filled with air, but all without success. At last a very small and smooth ivory pad was tried, which although it did not at first prove a complete remedy, yet was so very much more endurable that the use of it was persevered in, and the little inconvenience produced by it gradually subsided, and it is now worn with the greatest comfort. The other case, also of a female, was a small hernia, accompanied with the same irritable state of glands as in the former case; here also several sorts of trusses and pads were tried, among the rest the ivory pad was applied, but it produced so much pain, and the glands became so enlarged, that its use was very soon abandoned, and a pad filled with air substituted, which has been worn ever since, but is not so complete a

remedy as the ivory pad was in the former case, as the glands are now occasionally enlarged and inflamed, though not to the extent or so frequently as formerly. In femoral hernia great pressure is rarely necessary, indeed the glands are often subjected to greater pressure from the size of the pad than from the strength of the spring, for if the pad be too large it will indubitably press on the glands when the patient is sitting or stooping, and that with a very considerable degree of force. The next obstacle to the application of the truss is an irritable state of the skin. This is a species of hindrance very commonly met with, and is generally more easily managed than those cases where the glands are so disposed to be inflamed. The mischief produced by the pad in an irritable state of the skin is excoriation, more or less extensive. I have known patients whose skin is so prone to excoriate, that the truss has been obliged to be frequently left off while the parts were healing. In most of these cases the ivory pad has been found to be extremely useful; but in some, where there is cutaneous disease, it has not been so decidedly successful, although superior to any other; in truth, it is the kind

of pad particularly calculated for such untoward cases, for these reasons, that the stuffed pad appears to encourage excoriations from its generating heat, becoming foul, and from its causing friction; objections from which the ivory pad is exempt.* It is, therefore, easy to account for its utility in these cases, as I do not think that pressure, unless extreme, has so much to do with the mischief produced as heat and friction, but it is not so easy to account for its occasional utility in those cases where the glands are affected. There is no parity of reasoning; for in the latter cases the glands are more liable to injury by pressure; and were we to be governed by theory, a hard pad is the last we should think of selecting. I have witnessed a few cases, and the last very recently, where very slight pressure was a cause of annoyance to the patient; it was a case of double hernia, incepient on the left side, and scrotal on the right side. The spring of the right side of the truss was tolerably strong, but the left side very slight. After wearing the truss a few days, the patient

* The ivory pad cannot be used in direct inguinal, or in oblique inguinal hernia, when it is necessary to apply the pressure close to the bone.

began to complain of uneasiness on the left side; there was a blush on the skin for some distance above and around the pad, the minute vessels were very visibly gorged with blood, and the patient experienced a feeling of heat on that side of the abdomen, with a sensation which he described as between pain and itching, while nothing of the kind was seen or felt on the right side. A stronger spring was substituted for the weak one, and the annoyance subsided after a few days; to try the result, the weak spring was a second time worn, when the same annoyance was produced and again remedied by applying stronger pressure. The only way to account for this peculiarity is, by supposing that the slight pressure irritated the superficial nerves, and that the stronger pressure destroyed their sensibility. In the management of these and many other unusual cases, much depends upon the skill and experience of the artisan; if he is conversant with the anatomy of rupture, and well acquainted with the mechanism of trusses, he will generally succeed in finding an appropriate remedy, provided he is not too much prejudiced in favour of one description of instrument.

Before I close this work, let me direct the

attention of my readers to the increasing frequency of hernia, and to its insidious character. The common received opinion of hernia is, that it is a complaint suddenly produced by exertion, that opinion is erroneous, it is rarely so produced, but is mostly progressive. Exertion may gradually relax the parts and enlarge the ring, but in the greater number of instances a predisposition exists, and exertion only facilitates the descent of the tumour. I do verily believe, indeed I am sure, that there are thousands of persons in this metropolis who have hernia, and yet are unconscious of it. I am constantly detecting its presence when the parts are exposed to apply suspenders; and in consequence of the lectures I delivered on hernia at the various Mechanic's Institutions, numbers of persons called on me who had hernia, but who had no idea they were so afflicted until their attention was directed to the subject. Sir Astley Cooper, in his work on hernia, remarks: "This tumour occurs much more commonly than is usually supposed, for I have frequently found it in the dissection of bodies of persons who have never been suspected of labouring under the disease, nor have ever worn a truss. When strangula-

ted, these cases more commonly fall under the care of the Physician than the Surgeon ; for as the patient himself is often not conscious of having a tumour at the groin, the symptoms of strangulation are ascribed to inflammation of the bowels, and the patient dies as is supposed of iliac passion."

If then the complaint is so very general, and so likely to be unheeded in its early approaches, the utility of a work of this description addressed to the public cannot be questioned. That many parts of it will, from the nature of the subject and from my inability as an Author, be found rather abstruse, I am quite aware, yet I do hope that enough may be gleaned from it to enable the reader to detect the complaint when it occurs, to understand the proper construction and application of the remedy; and to convince him of the risk incurred by neglect.

FINIS.

DESCRIPTIONS OF THE PLATES.

EXPLANATION OF PLATES.

PLATE I.

Represents a portion of the human skeleton—viz, the pelvis, part of the spine, and part of the thigh bones.

a Crista of the ilium.

b The anterior and superior spinous process of the ilium.

c The os pubis. This bone is that part of the pelvis, commencing at the upper and fore part of the acetabulum, and continued to the symphysis pubis, where it is attached to the same bone of the opposite side.

d The crest of the os pubis.

e The symphysis pubis.

Pouparts ligament is stretched from *b* to *d*, but its first attachment to the os pubis begins at the spine of that bone, about an inch and a half from the symphysis pubis.

PLATE II.

Is intended to shew the abdominal rings, the course of the spermatic cord, and the situation of an incepient external inguinal hernia protruding through the upper ring. The common integuments are dissected off and turned down. The tendon of the external oblique muscle is cut through and turned up. The internal oblique and transversalis muscles are also turned up to give a clear view of the tumour passing through the upper opening.

a a The common integuments turned down.

b b External oblique muscles.

c The linea alba passing down to the symphysis pubis.

d The linea semilunaris.

e The symphysis pubis.

f Anterior and superior spinous process of the ilium.

g The *tendon* of the external oblique muscle cut open and turned up.

h The internal oblique muscle with its lower edge turned up.

i The transversalis with its lower edge also turned up.

j j The spermatic cords passing through the abdominal rings or lower openings. On the left side the spermatic cord is seen continued upwards and outwards, the upper opening through which it first passes from the body is hid by the rupture.

k An incepient hernia passing through the upper opening.

PLATE III.

A representation of R. D——'s case before the rupture was returned and supported by a truss. The size and weight of the tumour had drawn the skin of the scrotum below the penis, which is consequently out of sight. In passing the urine the front of the scrotum was always wetted, and frequently excoriated.

PLATE IV.

Shews a large femoral hernia — Pouparts ligament and the spermatic cord passing through the abdominal ring; for this purpose the common integuments are cut through and turned over.

a Pouparts ligament passing from the anterior and superior spinous process of the ilium to the angle of the pubis.

b The testicle.

c The spermatic cord.

d The hernia passing below pouparts ligament into the upper part of the thigh.

PLATE V.

Explains the application of Salmon's Opposite-sided Truss.

Fig. 1. A front view of the truss applied as for a complaint on the left side.

Fig. 2. A back view of the same.

PLATE VI.

Fig. 1 and 2. A front and back view of Salmon's Double Truss as applied for oblique inguinal hernia.

PLATE VII.

Two figures shewing the application of the Common Truss in direct inguinal and oblique inguinal herniæ.

Fig. 1. A truss applied for direct inguinal hernia, with the pad brought down close to the angle of the pubis.

Fig. 2. A truss applied for oblique inguinal hernia, the pad is situated higher, to cover the upper opening, the lower opening not being protected by the truss.

PLATE I.

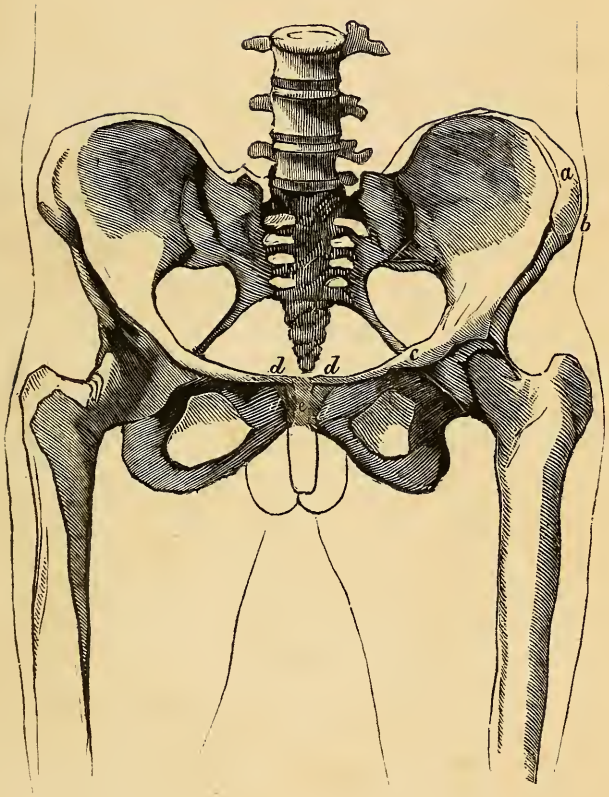


PLATE II.

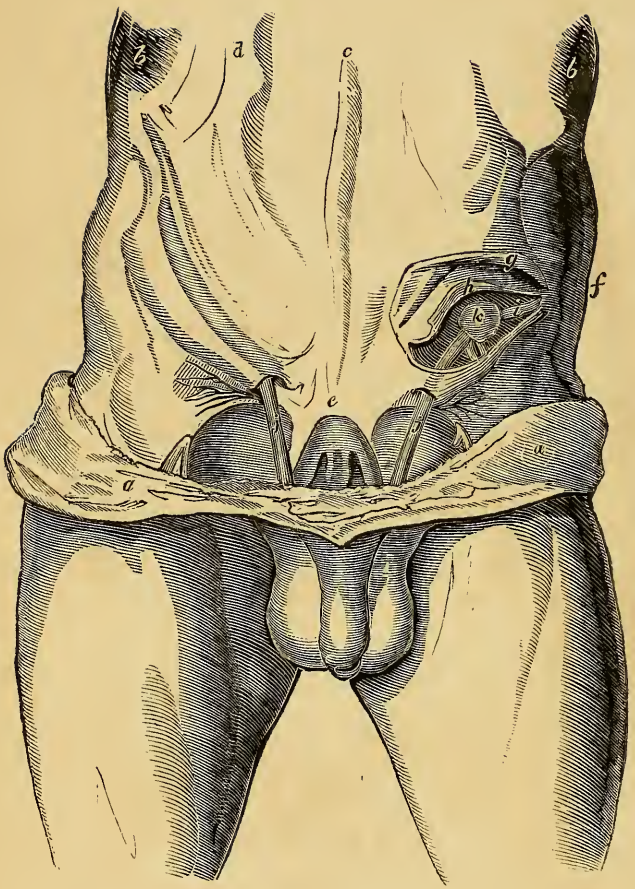


PLATE III.

MR. D——'S CASE.

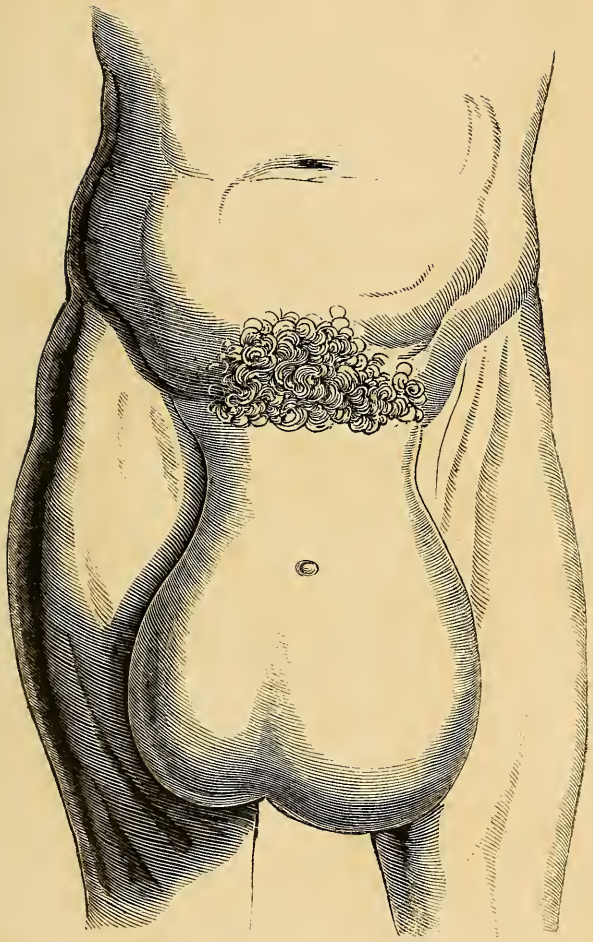


PLATE IV.

PLATE V.

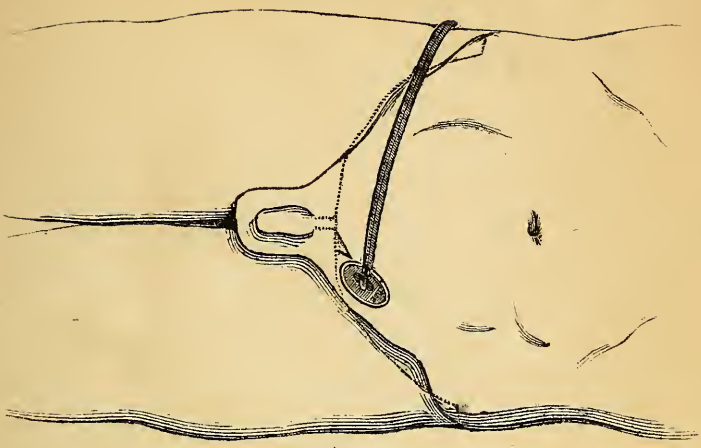


Fig. 1.

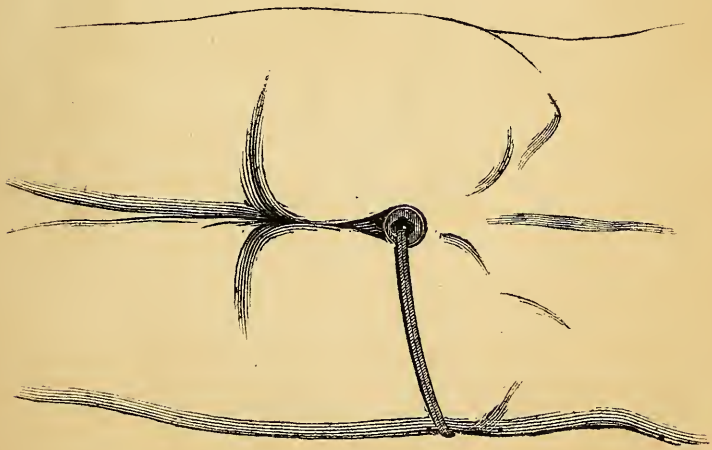


Fig. 2.

Fig. 1.

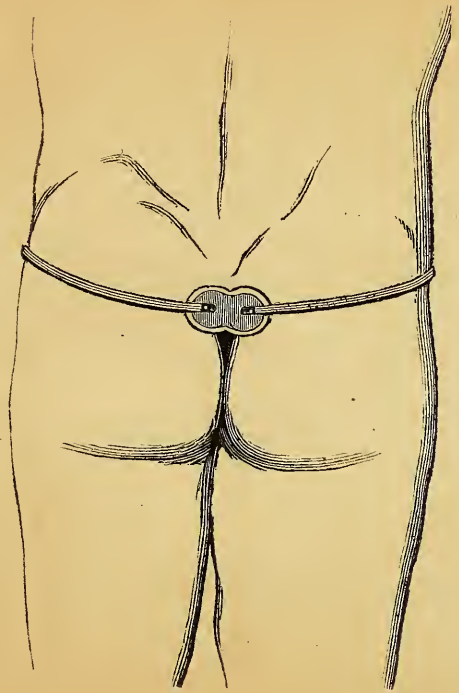


Fig. 2.

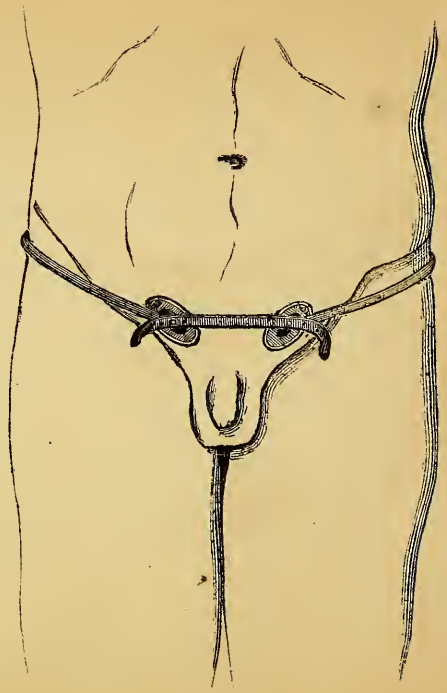


PLATE VI.

PLATE VII.

Fig. 1.

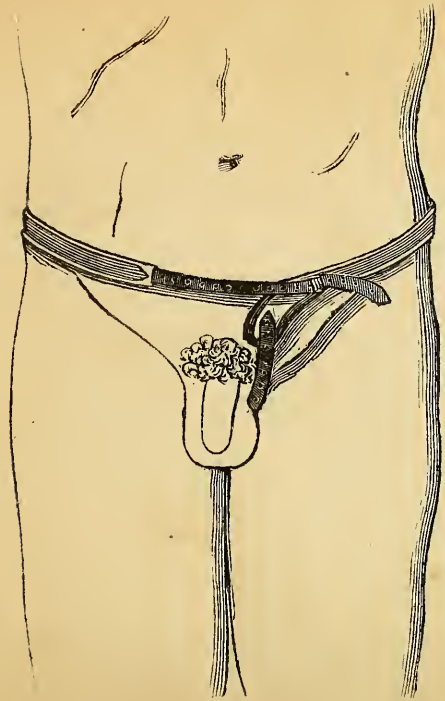
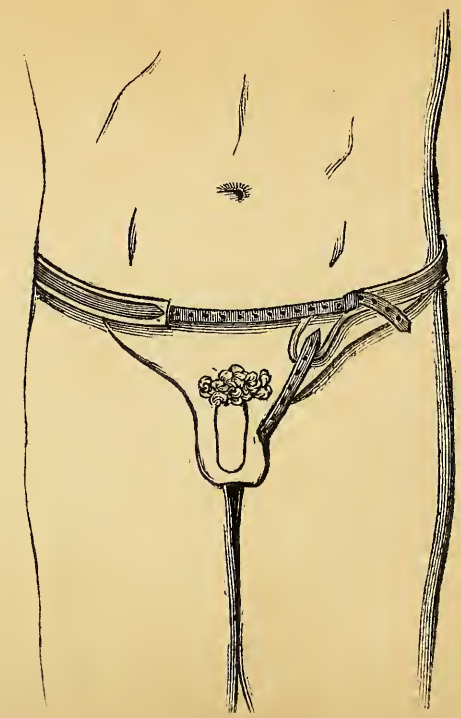


Fig. 2.



Hebrocele

The coverings direct Herma are Skin, Sup. fascia
fascia spermatica a partial covering cremaster.
conjoined tendon fascia propria etc.

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